AERONAUTICS (2)

. 1940 Vol. XLIX FEBRUARY 28th, 1946

L. A. L.

FLIGHT

and

AIRCRAFT ENGINEER

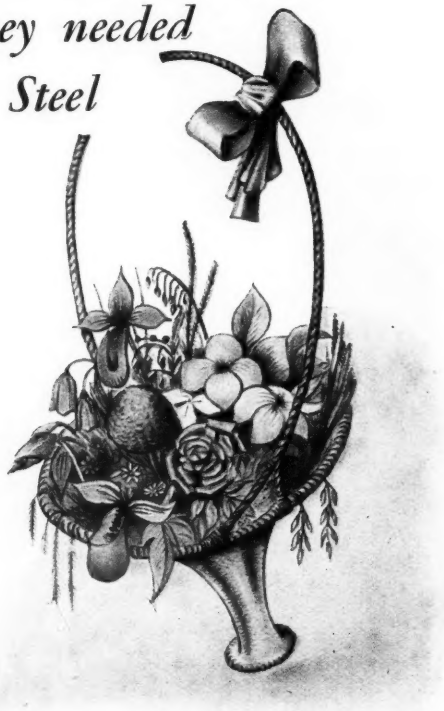
OFFICIAL ORGAN OF THE ROYAL AERO CLUB ONE SHILLING

SMITHSONIAN INSTITUTION
MAR 27 1946
LANGLEY AERONAUTICAL LIBRARY
3
Copy

THE DE HAVILLAND VAMPIRE

Speed Manœuvrability Endurance

We don't give ourselves Bouquets, it was our customers who first used the term "Habershon Quality" to indicate that they needed the finest Strip Steel available



STRIP STEEL
FOR ALL PURPOSES
by
HABERSHON
ROTHERHAM

"I'm glad we consulted Terry's before we went ahead"

Because this customer asked for our advice on his Spring problem before even completing his machine designs, we were able to save him a lot of time and to produce for him a safely stressed spring on which he could absolutely rely.

Spring designing is a skilled job, and our accumulated experience of over 90 years is freely at your disposal. So take advantage of it as early as possible when developing your new production.

When all's said and done the spring is the heartbeat of most machines, and if you want to be sure of maximum efficiency, our Research Department is waiting to serve you.

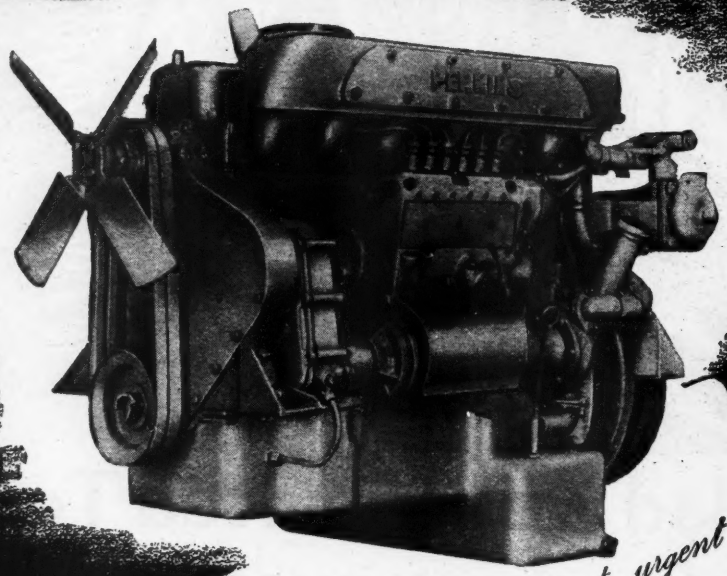
FAMOUS FOR SPRINGS & PRESSWORK SINCE 1855

TERRY'S *for* **SPRINGS**

HERBERT TERRY & SONS LTD., REDDITCH, ENGLAND

Also at LONDON · BIRMINGHAM · MANCHESTER

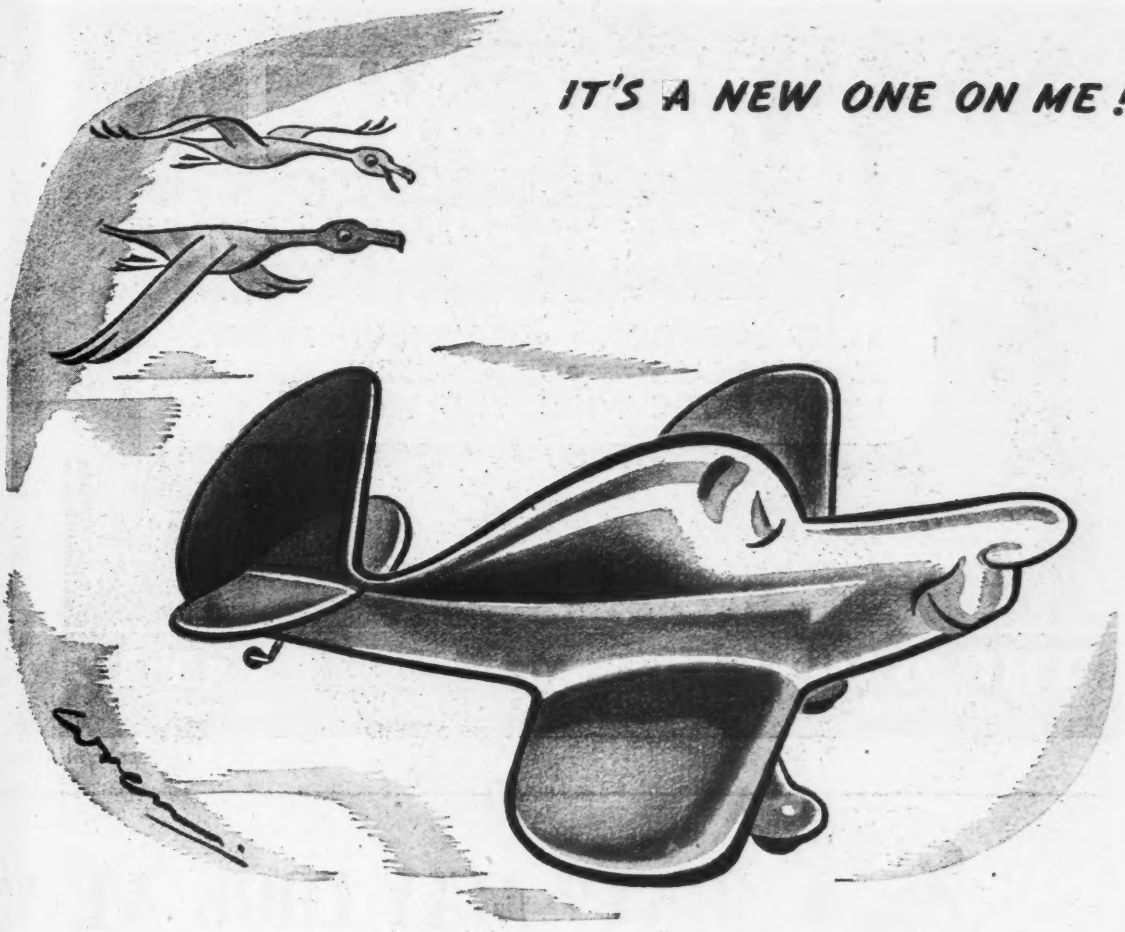
The Celebrated "P.6."



Still in demand from the fighting services for 17 different urgent war applications . . . apologies therefore are due to those of our customers who may have to wait — just a little longer.

Perkins DIESEL ENGINES

AVAILABLE FOR VEHICLE · INDUSTRIAL & MARINE APPLICATIONS



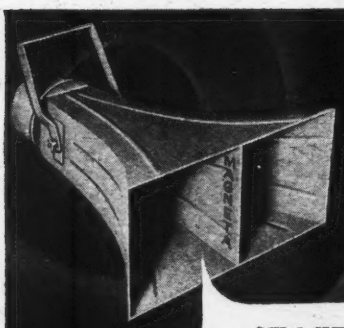
Since 1929, AIRWORK Limited, founders of Heston Airport, have maintained a fully-equipped organisation for the sale, conversion or reconditioning of new and second-hand aircraft. AIRWORK cater for every requirement, from a single machine for the individual to a whole fleet for big commercial undertakings.

THE SERVICES OF AIRWORK LIMITED:

- **Air Transport Contracting.**
- **Sale and purchase of new and second-hand aircraft.**
- **Operation and management of flying schools and clubs.**
- **Fly-yourself and air-taxi hire.**

AIRWORK
LIMITED

AIRWORK LIMITED, WESTBROOK HOUSE • BATH ROAD • HOUNSLOW • MIDDLESEX • HOUNSLOW 5451



MAGNETA

TRADE MARK

SOUND EQUIPMENT

STAFF LOCATION • ANNOUNCEMENTS
TIME SIGNALS • • FIRE ALARMS
• "MUSIC WHILE YOU WORK" •

SOUND SYSTEM IN INDUSTRY

THE MAGNETA TIME COMPANY LTD

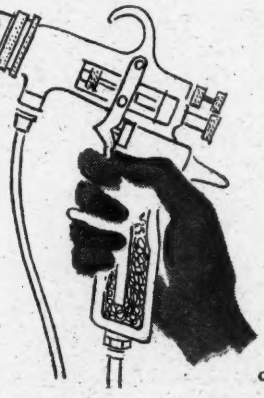
HEAD OFFICE GOBLIN WORKS, ERMYN WAY, LEATHERHEAD, SURREY TELEPHONE ASHTEAD 866 (8 LINES)

LONDON OFFICE: 57 HAYMARKET, S.W.1 TELEPHONE: ABBEY 2366-7

Please Write to Dept. F/M/14

A "GAT" MAY LOOK AT A KING

The gloss of royalty, like the polish of furniture or the fine finish of the modern motor car, is best applied with an Aerograph Spray Gun. Almost every branch of productive industry calls for "finishing"—and finishing calls for Aerograph equipment. Not because it's much quicker (tho' it *is*!) or easier for difficult surfaces (which it *is*!) but — chiefly because it produces a beautiful finish of matchless efficiency.



AEROGRAPH

EASIER AND A GOOD JOB TOO! QUICKER

SPRAY PAINTING and FINISHING EQUIPMENT

The Aerograph Co. Ltd., Lower Sydenham, London, S.E.26. Tel: Sydenham 6060 (8 lines)

CVS—225

In the development of Air Transport....

B.I.-Callender's have contributed in no small measure to the triumphs of the air—B.I.-Callender's products were installed in the aircraft of the pioneers.

In the future far-reaching developments of civil aviation, the extensive experience and research of B.I.-Callender's will be at the disposal of Engineers.

Among a range of more than a hundred B.I.-Callender's products the following are of direct interest to the aircraft industry: Aircraft Cables ; Cables, Wires and Capacitors for Radio Equipment ; Cables and Accessories for Aerodrome Power, Lighting and Communication Circuits ; and Aluminium Sheets and Sections.

B.I. Callender's

BRITISH INSULATED CALLENDER'S CABLES LIMITED.
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2.

MARSHALL CABIN BLOWERS

A TYPICAL HIGH SPEED MARSHALL CABIN BLOWER AS STANDARDISED ON MILITARY AIRCRAFT.

- We have been building these special blowers for the Royal Air Force since 1939.
- We have a complete range suitable for civil aircraft.
- We would welcome your enquiries on your pressure cabin problems as we have had a great deal of experience in this field during the past five years.

The illustration above shows a high speed Marshall Blower for military aircraft, type tested to 50,000 ft., 10,000 r.p.m., for fitting to the auxiliary gearbox. Our range of blowers extends from the small military units giving one to four pounds of air per minute at altitude, to civil versions giving 30 pounds of air per minute at rated height.

SIR GEORGE GODFREY & PARTNERS, LTD.
HAMPTON ROAD, HANWORTH, MIDDLESEX. **FELTHAM 3291**

NEWTON DERBY

UNDER THIS SYMBOL.....

Indicating precision Voltage Control, we now advise that these patent Automatic Regulators are now available for civil requirements. Since 1939 over 1,000,000 units have been manufactured in Great Britain and correspondingly large quantities in the U.S.A., Canada and Australia. Enquiries now welcomed.

CARBON PILE VOLTAGE REGULATORS

NEWTON BROTHERS (DERBY) LTD.

ELECTRICAL PLANT SPECIALISTS

HEAD OFFICE & WORKS, DERBY. Tel. Nos. : 4286/7. Telegrams : Dynamo, Derby.

Leytool RATCHET SPANNERS

INDISPENSABLE FOR SERVICE TOOL KITS

ESSENTIAL FOR ASSEMBLY LINES . . .

The "Leytool" Ratchet Spanner is an essential aid to speed and ease in installation, assembly and servicing work. It saves time and money. It is four times faster than ordinary spanners and gets into those awkward places where ordinary spanners will not go. Made of carbon chrome steel, hardened all over, it is of great mechanical strength and is the finest ratchet spanner made. Available in a number of stock sizes.

AS SUPPLIED TO ALL SERVICE GOVERNMENT DEPTS.
A.I.D. Approved 793672/38.

HEXAGON SIZES		
Standard Nut	Wrench Size	Width A/C Flats
0BA	1	.413"
1BA	1	.365"
2BA	1	.324"
3BA	1	.282"
4BA	1	.248"

3/16"	WHIT.	1 or 2	.448"
7/32"	,,	2	.525"
1/4"	,,	2 or 3	.600"
9/32"	,,	3	.710"
5/16"	,,	3	.820"
11/32"	,,	3	.920"
3/8"	,,	3 or 4	1.010"
13/32"	,,	4	1.100"
7/16"	,,	4	1.200"
15/32"	,,	4 or 5	1.300"
1/2"	,,	4 or 5	1.390"
9/16"	,,	5	1.480"
1"	,,	5	1.670"

1/4"	BSF	1 or 2	.448"
5/16"	,,	2	.525"
3/8"	,,	2 or 3	.600"
7/16"	,,	3	.710"
1/2"	,,	3	.820"
9/16"	,,	3	.920"
5/8"	,,	3 or 4	1.010"
11/16"	,,	4	1.100"
3/4"	,,	4	1.200"
7/8"	,,	4 or 5	1.300"
1"	,,	5	1.480"
1 1/8"	,,	5	1.670"

SQUARE SIZES	
Wrench Size	Width A/C Flats
1	.250"
1	.313"
2	.375"
2	.438"
3	.500"
3	.625"
3	.750"
4	.875"
4	1.000"
4 or 5	1.125"
5	1.250"

Write for Illustrated Pamphlet and prices.

Manufactured by

Leytonstone JIG & TOOL Co. Ltd.

606, HIGH ROAD, LEYTON, LONDON, E.10

Distributors' enquiries invited for Home and Export trade.

Phone: Leytonstone 5022-3.
Telegrams: "Leytool, Leystone."

ALEXANDER

MASTER TOOLMAKER

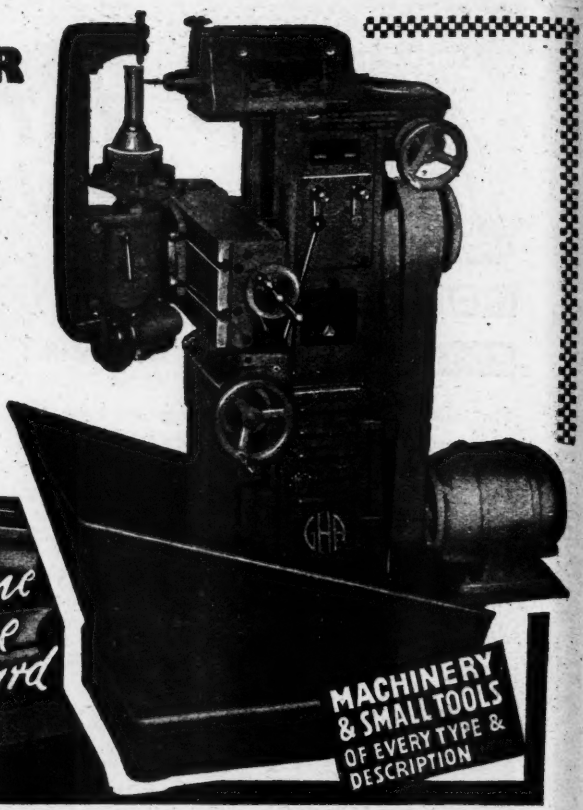
Indispensable for accurate milling, slotting, boring, etc. on moulds, press tools and gauges.

VERTICAL TABLE:

Clamping Surface ...	7¼in. by 21¼in.
Motion horizontally	9¾in.
Motion vertically	11¾in.

DIMENSIONS AND WEIGHTS:

Overall Height of Machine ...	55in.
Overall Height of Machine with Vertical Milling Head	61in.
Overall Space Required	47in. by 43¼in.
Net Weight of Machine	1120lbs. approx.



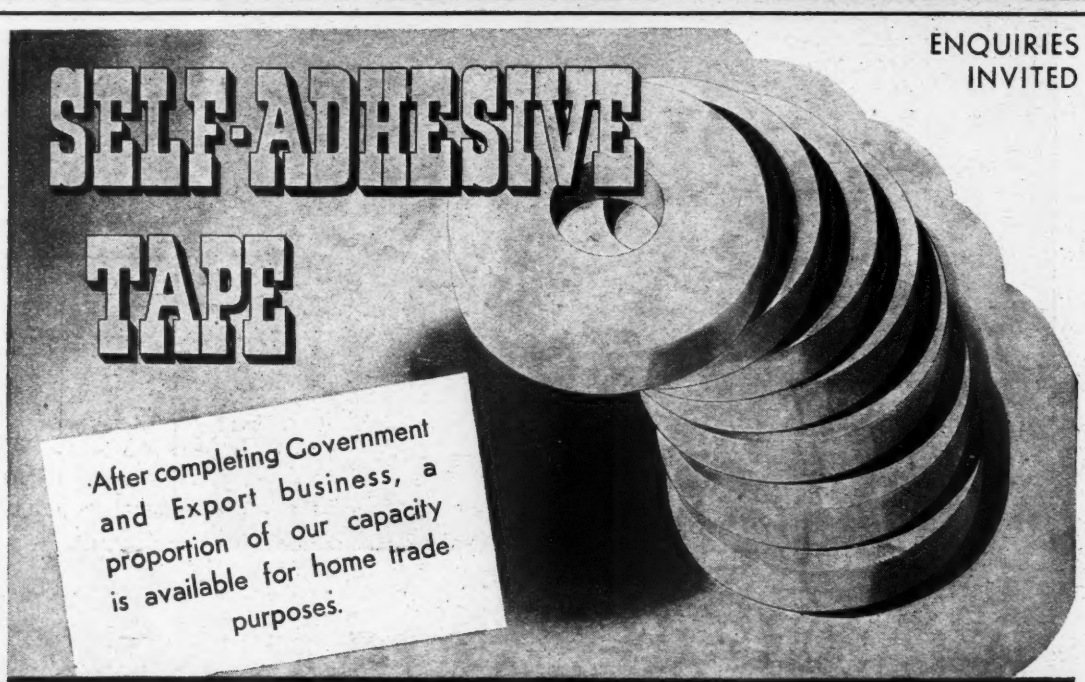
The Machine for the awkward Job

MACHINERY & SMALL TOOLS OF EVERY TYPE & DESCRIPTION

GEORGE H. ALEXANDER MACHINERY LTD.
COLESHILL STREET. BIRMINGHAM. 4.

ENQUIRIES INVITED

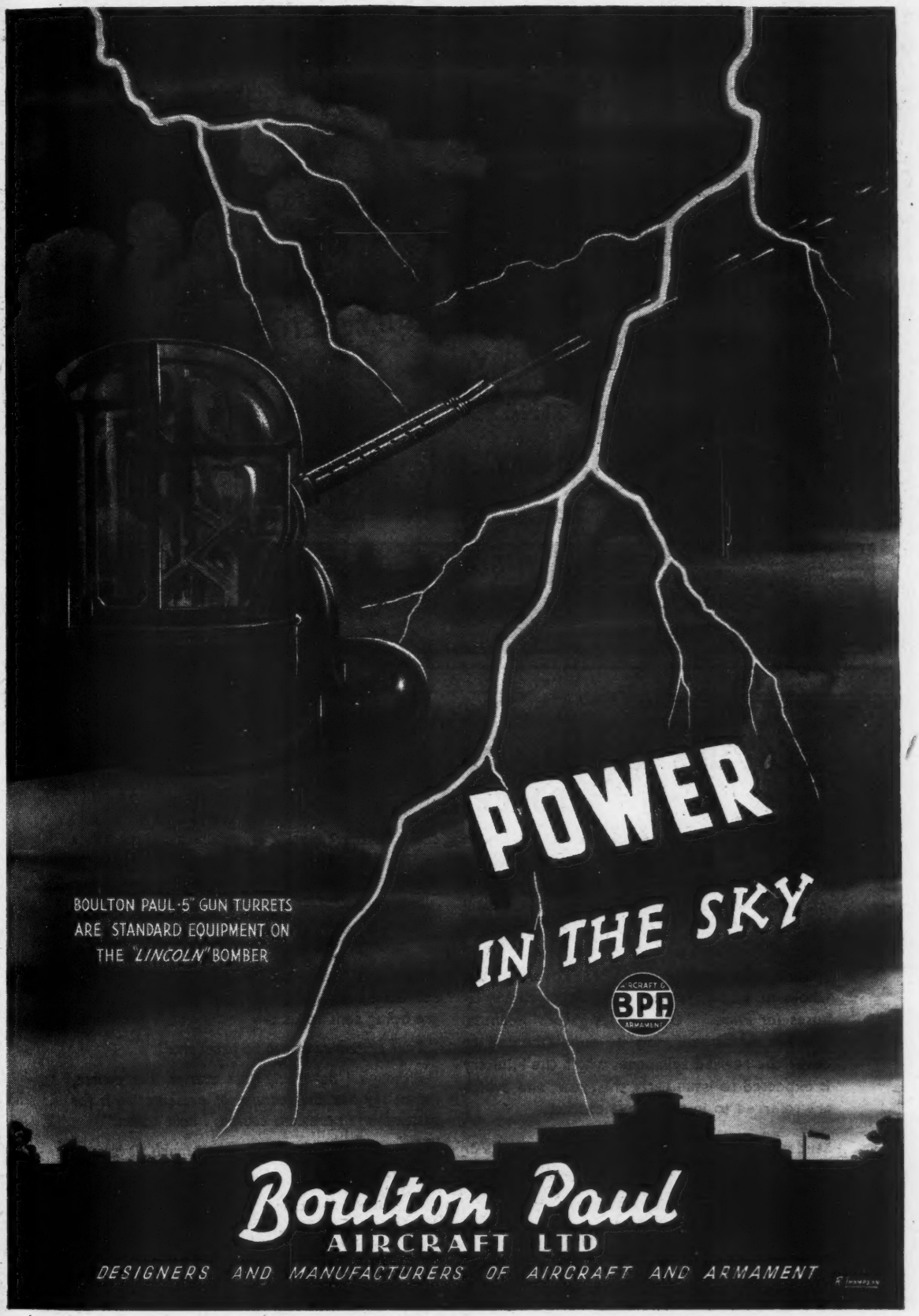
SELF-ADHESIVE TAPE



After completing Government and Export business, a proportion of our capacity is available for home trade purposes.

SAMUEL JONES & CO. LTD

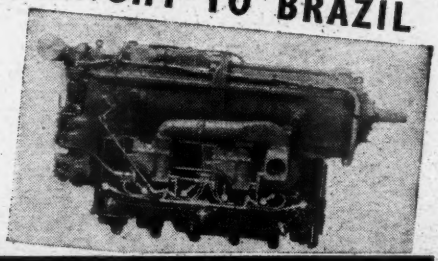
16-17 NEW BRIDGE STREET. E.C.4. PHONE: CENTRAL 6500


POWER
IN THE SKY
BOULTON PAUL·5" GUN TURRETS
ARE STANDARD EQUIPMENT ON
THE "LINCOLN" BOMBER
AIRCRAFT &
BPA
ARMAMENT
Boulton Paul
AIRCRAFT LTD
DESIGNERS AND MANUFACTURERS OF AIRCRAFT AND ARMAMENT

MR. JIM MOLLISON'S DELIVERY FLIGHT TO BRAZIL

★ THE PERCIVAL PROCTOR V
powered by the
★ GIPSY QUEEN II ENGINE
equipped with two
★ HOBSON CARBURETTERS
(Type A.I., 48-L.M.)

and Hobson-Penn Automatic Mixture Control effecting considerable economy in fuel. Once again the efficiency and reliability of Hobson Carburetters on long distance flights has been demonstrated.



H. M. HOBSON AIRCRAFT & MOTOR COMPONENTS LTD

LONDON AND AIR TRANSPORT COLLEGE PORTSMOUTH

Does this extract from a notice to airmen concern you?

" In conclusion, it remains all the more desirable that members of crews serving in civil aircraft who have been granted licences during the war and other persons seeking licences for operational duties in the capacity of airline transport pilots or navigators, should endeavour as soon as possible to reach the requisite standards for the new licences."

If so, we can help you

Special courses are available covering the whole or any individual sections of the syllabuses for Pilots' " B " or Navigators' licences. These courses will also be supplemented to cover the revised syllabuses which the Ministry is expected to issue early this year, and which are referred to in the above extract.

Students already studying the specialised Air Transport College Courses are very enthusiastic about them, and following are just three Service Pilots' opinions from the many which are being sent to us :—

" Your system seems to be excellent."

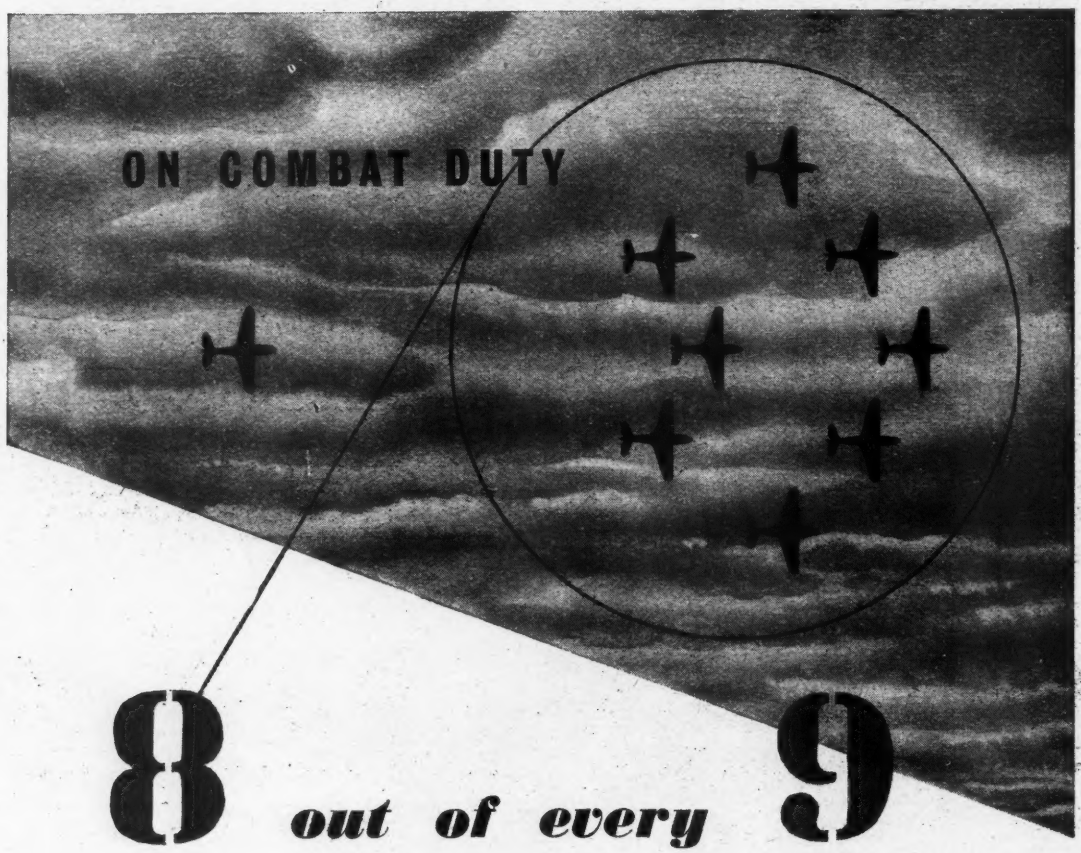
" Although I have only just started the course, I must say that the manner of presentation is far better than in previous courses I have taken."

" I am enjoying this course very much, it is most interesting."

You are invited to write for the " B " Licence Booklet to—

AIR TRANSPORT COLLEGE LIMITED
DEPARTMENT P.B.F., 2 DRAPERS GARDENS, LONDON, E.C.2

Blackburn
"FIREBRAND"
STRIKE AIRCRAFT OF THE F.A.A.



8 out of every 9 British Naval Aircraft were Fairey types

Deeds speak louder than words. Without comment, but by no means without pride, we record one part of our contribution to the victory.

No fewer than eight out of every nine operational aircraft of British manufacture that were delivered to the Royal Navy from all sources were Fairey types.

Today, the Fairey Firefly is officially cited as "the standard two-seat Fighter Reconnaissance Aircraft in Naval Service."

THE FAIREY AVIATION COMPANY, LTD., HAYES, MIDDLESEX

FLIGHT
and
AIRCRAFT ENGINEER

Editorial Director G. GEOFFREY SMITH, M.B.E.
Editor - - C. M. POULSEN
Assistant Editor - MAURICE A. SMITH, D.F.C. (WING CDR., R.A.F.V.R.)
Art Editor - - JOHN YOXALL

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1
Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (35 lines).

COVENTRY: 8-10, CORPORATION ST. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.
BIRMINGHAM, 2: GUILDHALL BUILDINGS, NAVIGATION ST. Telegrams: Autopress, Birmingham. Telephone: Midland 2971 (5 lines).
MANCHESTER, 3: 260, DEANSGATE. Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.
GLASGOW, C.2: 26B, RENFIELD ST. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Abroad: Year, £3 1 0. 6 months, £1 10 6.
Registered at the G.P.O. as a Newspaper.

No. 1940. Vol. XLIX. February 28th, 1946. Thursdays, One Shilling.

The Outlook

The Strength of British Forces

THE White Paper which the Prime Minister presented to Parliament on February 22, entitled "Statement Relating to Defence," does not help us to estimate what the future strength and composition of the Royal Air Force will be. It states frankly: "This is not the time to come to decisions about the eventual shape of our post-war forces." It deals with the massed figures of all the Services and of the production workers behind them, and it gives the programme for demobilisation up to June 30 and December 31 of the present year.

The close of the fighting found the United Kingdom with a grand total of 9,000,000 men and women in the Forces or directly supplying their needs. Taking trained men alone in the three Services, the Government proposes to reduce the number to 1,900,000 by June 30 and to 1,100,000 by December 31. There must also be another 100,000 men under training.

Rate of demobilisation has been largely governed by the amount of transport available. Warships of the Navy have brought many back home, and Transport Command, supplemented by part of Bomber Command, was at the peak period moving 9,000 a month in each direction on the eastern route. The White Paper remarks: "As demobilisation proceeds still further the air trooping programme must inevitably be brought to a close."

Caution must be observed in dispensing with our fighting men, for we have (the White Paper reminds us all) eight serious duties to perform, namely, occupation of the British zone in Germany; occupation of Austria; maintaining law and order in Venezia Giulia; troops in Greece; troops in Palestine; clearing the Japanese out of S.E. Asia; internal security throughout the Empire; and safeguarding communications and maintaining our bases.

The provision in the Estimates is interesting. The Navy, for once, gets the smallest allocation—only 255 million pounds; the Army gets 682 millions; the Air 256, and Supply and Aircraft Production 474 millions. Presuming that Aircraft Production gets a substantial share of the last figure, the Air does not do too badly in comparison with the older Services. It will be noted that the last two items together exceed even the allocation for our temporarily swollen Army.

Vicious Circle

THE Government's decision not to subsidise the flying clubs can hardly be said to have come as a surprise, regrettable as it is. It has been known for a long time that the Air Council considers them to be of little importance, and it may be assumed that the Government and the Treasury took their cue from this fact. We believe that Lord Winster was sympathetic (he has often expressed his desire to see flying taken out of the wealthy class and brought within the reach of a wide public), but evidently the opposition has proved too strong for him.

There is little profit now in arguing the pros and cons. The decision has been taken. But one does wonder whether the full implications have been considered. The immediate results are described and discussed on p. 219, but some less obvious aspects should be taken into account by the authorities. We refer to the effect on aircraft and engine manufacture. It appears very doubtful whether this point has been thoroughly considered, especially bearing in mind the fact that, in other spheres, the Government does not seen to have grasped the point that a healthy home market is the basis of the export business which, on all sides, is admitted to be essential for the recovery of the country.

Before the war, the light aircraft clubs between them used several hundred aircraft—they handed-over some 600 to the R.A.F. With engines and spares this amounted to quite a useful foundation for private sales at home and abroad. It may be argued that the type of

aircraft used by clubs for primary flying instruction is not necessarily ideal for the private owner. But even if that be granted, there is the question of engines. A very great variety of aircraft types can, as we saw before the war, be "built around" one type of engine. Consequently the clubs had a not inconsiderable effect on engine production and, therefore, on engine costs. With the clubs removed from the market, the British manufacturer of low-powered engines will find it difficult to reduce his engine prices to a level at which he can hope to sell them abroad. The price of aircraft as well as of engines will, therefore, be increased, and the export of light aircraft will be seriously hampered.

The small manufacturer has not the capital needed for laying down a large production programme in order to bring down manufacturing costs; while the larger firms can hardly be blamed for giving priority to the higher-powered engine types for which the demand is likely to be more assured. It would seem that, unless some wealthy man or concern is willing to put a lot of capital into the manufacture of a low-powered engine, the outlook is somewhat depressing. Perhaps Lord Nuffield might be persuaded to re-enter the engine market in a large way. There are, in fact, rumours that some such plan is afoot.

Second-line Strength

UNTIL the next Defence White Paper has been published and we learn of any arrangements which have been made to keep a proportion of the vast number of ex-aircrew members in flying training, it is difficult to be constructively critical about the other aspects of the club decision. But there is no doubt that a large number of amateurs feel that they have been extremely ill-used.

The services of hundreds of club-trained pilots, who had spent, in their enthusiasm, a great deal more than they could reasonably afford on their flying in peacetime, were accepted, either directly or indirectly, without question or even thanks, by the Air Force and Navy. If the clubs had never existed, this second-line aircrew strength would not have been available in the days of emergency. Yet these enthusiasts are now to have their pastime, and even, in some cases their means of livelihood, taken from them without explanation or a show of gratitude.

Throughout the various discussions there has been too great a tendency to consider only future club trainees and their possible value. But there are still the thousands of trained and useful pilots who should be kept in practice, and among these there is going to be a very big proportion who will not, for age or fitness reasons, be considered for any future volunteer appointments, yet who will be just as useful in a future emergency as they ever were.

CONTENTS

Outlook	203
The Latest Mosquitoes	205
Here and There	209
British Civil Aircraft	210
Quo Vadis?	212
Boston and Havoc	a
Propjet and Plain	216
Air Survey of West Africa	218
No Subsidy for the Clubs	219
Approved Air Routes	220
Informal Radar Conference	221
Civil Aviation News	222
Correspondence	223
Service Aviation	225
The Industry	228

"Flight" photograph.

ON THE TARMAC: Fairey Fireflies and a Spearfish awaiting production-testing at Heston. The Fairey Aviation Company's own airfield at Heathrow has been incorporated in the big commercial airport now under construction.

The Mark 34 Photographic-Reconnaissance Mosquito exercising without drop tanks.

The Latest Mosquitoes

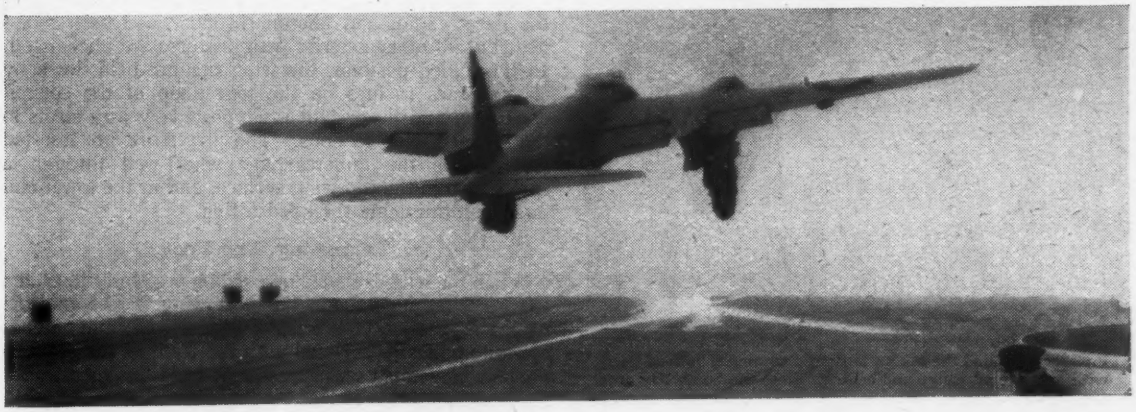
Improved Performance with New Rolls-Royce Merlin Engines

SINCE the first delivery of Mosquitoes to the R.A.F. in July, 1941, these aircraft have enjoyed unrivalled popularity in almost every Command and theatre of operations. At any minute of the night or day during the later stages of hostilities in Europe it would have been reasonably safe to wager that at least one Mosquito would be airborne.

Quite recently a new version of Mosquito was introduced for Naval carrier-borne work, with four cannons, and 18in. torpedo or alternative loads of bombs and R.P.s. The Mark 33, or Sea Mosquito, as it is called, has manually folding wings, and arrester hook, also a modified nose to take Radar equipment. Basically, it is a development of the Mark 6 fighter-bomber.

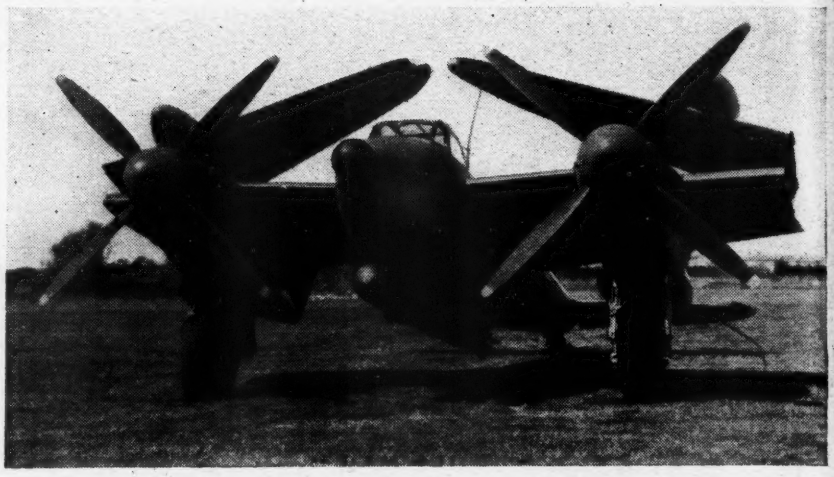
Mk 33	Sea Mosquito
Mk 34	Photo Reconnaissance
Mk 35	High Altitude Bomber
Mk 36	Night Fighter

Considerable modification to wing structure has naturally been entailed, as the Mosquito wing was never intended to fold. In a manner rather similar to that employed on the Sea Hornet, alclad sheet has been let into the top and bottom wing surfaces both inboard and outboard of the folding point. The spanwise stringers in the skin have been cut down slightly and are sandwiched between the alloy sheets. The two ribs at the folding point are made up of thick alclad-spruce-alclad sandwich webs with laminated booms. The alloy



Without external assistance the Sea Mosquito prototype with Merlin 25 engines, flies off during its first deck trials. Prior to this, the only twin-engine aircraft to take off from a carrier were the Mitchells on the first Tokio raid.

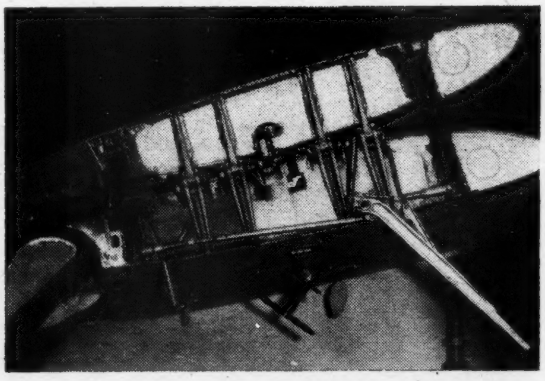
THE LATEST MOSQUITOES



The Mark 33 Sea Mosquito loaded and folded. This photograph of the prototype shows the four-bladed airscrews, the slinging of the 18-inch torpedo, and, on the folded wings, the 50-gallon drop tanks for which bombs may be substituted. The standard D.H. undercarriage is replaced by Lockheed hydraulic legs on the production aircraft.

sheet is 18 gauge and, with the spruce, the web of the rib is 1¼in. thick. Redux bonding is used at the metal-to-wood joints.

The outer wing section folds on four centrally-disposed light alloy hinges, and the latch pins and their pick-up fittings are bolted to the lower booms of the two main spars. The bolts have a mechanical lock and are withdrawn simultaneously when a large spring-loaded lever is folded down and rearwards from the wing joint. Positive locking is confirmed by the retraction of two red flags on the upper wing surface at the folding point. The aileron controls are carried past the folding point in short sections of heavy Bowden cable, and small spring-loaded doors in the skin are closed by levers operated by buffers as the wings reach the fully spread position.



The four hinges, two latch pins, and spring-loaded lever for the manually-folding wing of the Sea Mosquito.

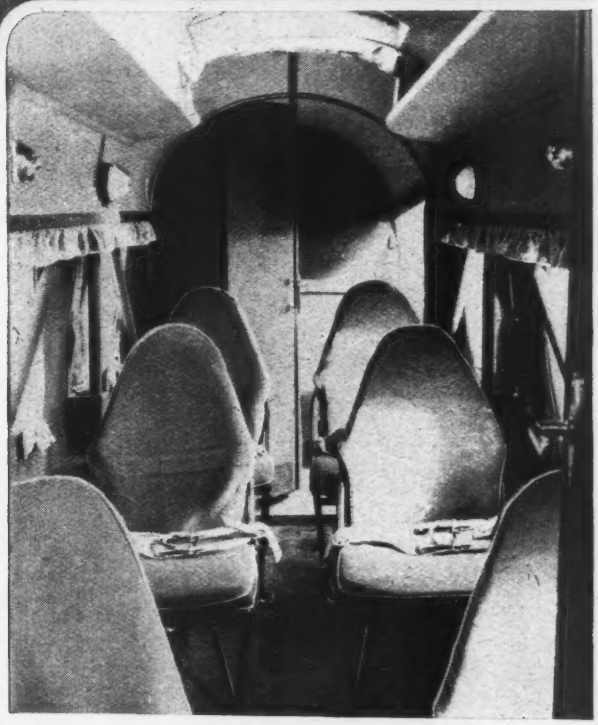
Speed and manoeuvrability represent safety to the unarmed P.R. aircraft, and the Mk.34 Mosquito combines both of these with exceptional range and ceiling. Note the bomb-bay area enlarged to receive extra tanks, and the various camera ports. The increased engine length permits six separate inboard exhaust stubs on the Merlin 114s. The Mk.34 carries two split F52 cameras forward and two more F52s and an F24, oblique, aft.

The wings are folded by a crew of three or four using a pole, and the hinge point is immediately outboard of the flaps. Flap and aileron shrouds have been modified, but all other exterior wing features are unchanged. In the folded position, the wing tips are held down by elastic ropes to lugs on the rear hoop of the cockpit enclosure, and the weight is supported by jury struts to the inboard wing sections. The jury struts are inserted from inside the undercarriage wheel-well through a spring flap in the top wing surface, and at the lower end screw into an acme threaded fitting.

Trimming Tab Lock

When the wing is folded on existing Sea Mosquitoes, the aileron trimming tab on the port wing is disconnected by the separation of two small gear wheels, and catches are automatically engaged with the teeth of the gears to prevent movement and consequent maladjustment, until re-engagement takes place.

Among modifications to the structure of the Sea Mosquito is the introduction of a bulkhead in the fuselage above the attachment points of the arrester hook, and



Ideal for private charter or for feeder lines

- Reasonable first cost.
- Minimum upkeep charges.
- Economical operating costs.
- Exceptional reliability.
- Cruising speed 155 m.p.h.
- Range with 6 passengers, toilet and radio, 572 miles.
- Range with 9 passengers and radio, 334 miles.
- Cargo and baggage capacity 500 lbs.
- Modern heating, ventilating, sound-proofing and lighting.

for quick delivery order the —

AVRO XIX

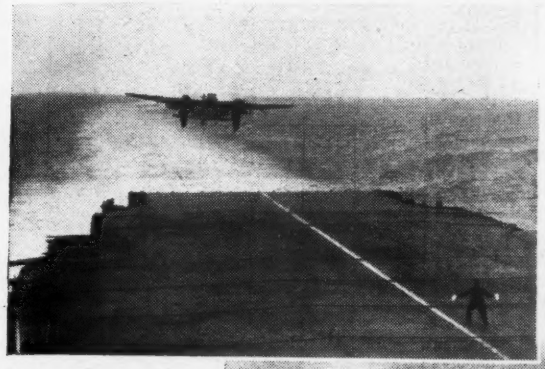
now!

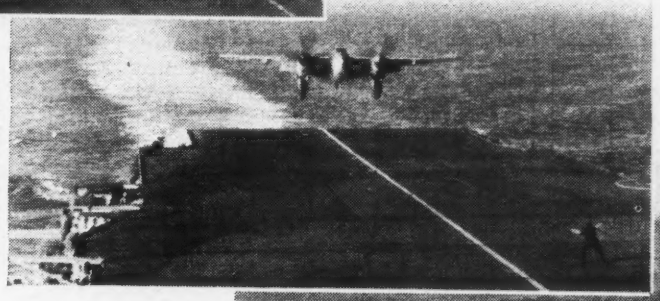
AVRO

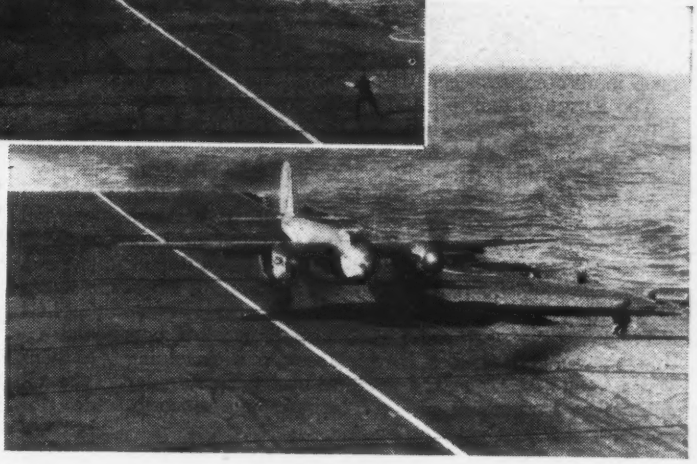
A. V. ROE & CO., LTD., MANCHESTER, ENGLAND

BRITISH WARTIME AIRCRAFT
THE "SHORT STIRLING"
fitted with KIGASS
Engine Starting Equipment
as used on all British
Aircraft
KIGASS LIMITED
31, REGENT GROVE, LEAMINGTON SPA
Telephone: Leamington Spa 2480-1

THE LATEST MOSQUITOES







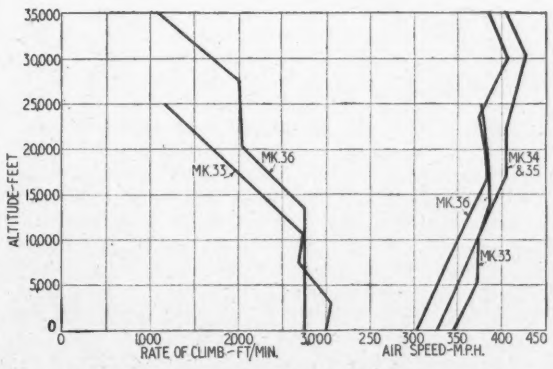
The Sea Mosquito approaches and touches-down on an aircraft carrier for the first time. The arrester hook is attached at two points on the fuselage about midway between main planes and tail. Note the evasive action taken by the "batsman."

the inclusion of two "straights" similar to those used on the Sea Hornet. The straights are large laminated longerons stretching from the arrester hook attachment points to the rear wing spar. The hook is bolted through the fuselage wall to the straights, and they are in turn bolted, via modified fittings, to the rear main wing spar at its attachment points. The fuselage is otherwise standard, but some reinforcement will be included in the next aircraft off so that R.A.T.O.G. may be employed. The attachment will be of the normal three-point type, and the position on the fuselage is just below and behind the flap trailing edge. No provision is made for assisted take-off at the present time. The weight sacrifice for folding wings, used for the first time on a highly-stressed monoplane wing of wood construction, is just over 300 lb.

Later Sea Mosquitoes have smaller wheels (those used on the Beaufighter) and Lockheed hydraulic shock-absorber legs, but trials with the prototype were carried out with the standard D.H. undercarriage.

The torpedo is slung externally, and is supported by a tubular fitting bolted at the top end to the front main wing spar at the point of the c.g. Two drag struts are led to number four bulkhead below the pilot, and the rear steady points are braced from the rear cannon-support members. When the torpedo is carried, the bomb doors are closed and the bomb bay empty; the alternative load is two 500-lb. bombs stowed internally, and either two more 500-lb. bombs under the wings, or rocket projectiles, or drop tanks.

To assist in take-off, the Sea Mosquito has large-diameter (12ft. 6in.) four-bladed airscrews which give a thrust improvement of 5-10 per cent. The engines are Rolls-Royce Merlin 25s with a take-off rating of 1,620 b.h.p. at 3,000 r.p.m. and +18 lb. boost. This figure is nearly 100 h.p. higher than for other recent marks of Mosquito.



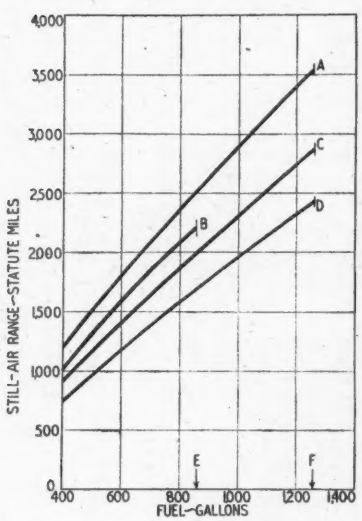
Variation of true airspeed with altitude for the Marks 33, 34 and 35, 36, and of rates of climb for the 33 and 36.

Deck-landing Trials

All carrier-borne squadrons are at present equipped with single-engine aircraft, and until the spring of 1944 no attempt had been made to operate a twin from the deck of an aircraft carrier. However, at that time it became apparent that Naval operations might be handicapped in the future by the restrictions in size, range, accommodation, etc., imposed by the exclusive use of single-engine aircraft. It was decided, therefore, that deck-landing trials with two-engine aircraft should be instituted without delay, and a Mosquito F.B. Mark 6 was selected as being representative of modern high-performance twins.

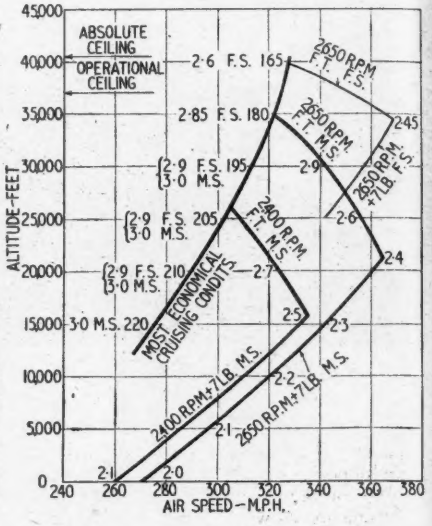
The trials were carried out on March 25th and 26th, 1944, from H.M.S. *Indefatigable*, and the Mosquito L.R. 359 was piloted by Lt. Cdr. E. M. Brown, M.B.E., D.S.C. One of the Navy's most experienced "batsmen" joined the ship for the trials, and his job called for particular skill and agility as the engine nacelles made it difficult for the pilot to see him on the approach unless he stood dead ahead of the aircraft until touch-down. The pilot's view on the approach for deck landing is very

THE LATEST MOSQUITOES



The range curves for the P.R. Mk. 34 represent the following conditions :— A. Most economical in M.S. gear at 25,000ft. at a mean true speed of 300 m.p.h. B. Most economical in F.S. gear at 40,000ft. at a mean true speed of 310 m.p.h. C. Max. continuous (2,650 r.p.m., +7 lb.) in M.S. gear at 21,000ft. at a mean true speed of 350 m.p.h. D. Max. continuous (2,650 r.p.m., +7 lb.) in M.S. gear at sea level at a mean true speed of 265 m.p.h. Capacities marked E and F represent the maximum fuel load without and with drop tanks, respectively.

With an average all-up weight of 20,000 lb. and no external equipment, the consumptions and speeds indicated are given by the P.R. Mk. 34 and B. Mk. 35. Beside the most economical cruising curve are A.M.P.G. figures for M.S. and F.S. gears, also the I.A.S. In addition, A.M.P.G. figures are indicated beside the curves for other operating conditions up to maximum continuous cruising with full throttle.



good in all other respects and no complaints were made.

The Mosquito took off and landed successfully seven times during the first trials, but on the eighth landing the arrester hook was fractured. The pilot opened-up immediately and, fortunately, was able to take off again.

On the second series of deck landings, made on May 9th and 10th, Lt. Cdr. Brown and Cdr. H. J. F. Lane took off and landed seventeen times without mishap, although on one occasion the arrester hook failed to pick up the wire, and the pilot had to depend upon his wheel brakes to bring the aircraft to a standstill.

Following these successful trials with the Mark 6, production was started of a Naval Mosquito with folding wings, deck-arrester gear, a modified nose to carry radar equipment, and provision for a torpedo or a 2,000-lb. bomb.

Sea Mosquito Performance

The performance of the Mark 33 is an all-round compromise in view of its diverse duties. It is important to mention that no attempt has been made to operate this mark at maximum conditions comparable with those expected in wartime. With assisted take-off the present maximum weight of approximately 22,000 lb. (49 lb./sq. ft. wing loading) could certainly be increased. It will be remembered that the Mark 16, with less power, and without assistance, but on a full-length runway, took off at weights up to 25,200 lb. with a wing loading of 56 lb./sq. ft. The width of the Mark 33 with wings folded, is 27ft. 3in., and the height 13ft. 6in.

One reason for limiting the peacetime weight figures for the aircraft is to make sure that single-engine flying shall be possible without undue risk, and with power in hand. Normally, Mosquito single-engine performance has always been extremely good, but with three paddle blades, or with four blades, the windmilling drag of an airscrew is high and, should an engine refuse to feather, an appropriate increase in power and single-engine safety speed is called for. In addition, for reasons of economy in fuel, and reduction of wear and tear on components, it is to be expected that the use of maximum power output will be discouraged for all normal flying.

Another late mark of Mosquito is the Night-Fighter Mark 36, which is also a development of the F.B. Mark 6, via the N.F. Marks 13, 19 and 30. The N.F. 36 differs from the N.F. 30 in details only, and in the type of Merlin engines fitted. It may be described as a high-altitude, higher-powered night-fighter, and the Merlin 113 has a maximum rating in F.S. gear of 1,430 b.h.p. at 27,250ft. By comparison with the Mk. 34, maximum speed is about 25 m.p.h. lower, due to the fitting of flame-damping exhaust stubs. At 35,000ft., with a weight of 20,000 lb., the climb is still over 1,000 ft./min.

The high-altitude series of Merlins, of which the 113 and 114 are members, embodies detail improvements to their superchargers and has S.U. fuel-injection pumps. The 114s which power the Mosquito 34 and 35, to be described next, have drives for cabin-pressure pumps but are otherwise the same, and give the same power. The Mosquitoes Mark 34 and 35 replace, respectively, the P.R. and B. Mark 16s which had Merlin 77 engines.

To examine first the Photographic Reconnaissance Mark 34, in addition to change of power unit, this very-long-range aircraft has been equipped with a large belly tank to bring the total petrol capacity up to 1,269 gallons. A small penalty in speed must be paid for this, but it only amounts to about 6 m.p.h. at maximum power. Its maximum speed is 425 m.p.h., and its cruising speed 315 m.p.h. at 30,000ft.

If additional cameras or equipment are required, a smaller belly tank, giving a maximum aircraft fuel capacity of 1,192 gallons, may be fitted. Petrol load might still have to be adjusted to keep the all-up weight below the 25,500 lb. permitted. Four hundred gallons of the fuel are carried in the two wing drop-tanks.

The improved performance of the P.R. Mark 34 and of the B. Mark 35 is apparent at altitude, where considerably more power is available, and the ceiling has been increased by 3,000ft. At economical cruising conditions between 10,000 and 30,000ft., three air-miles per gallon can be achieved at speeds varying from 220 to 195 I.A.S. For the Mark 34 this gives a maximum still-air range of over 3,500 miles.

There is little new about the Bomber Mark 35 which, except for its engines, is identical with the 16, now out

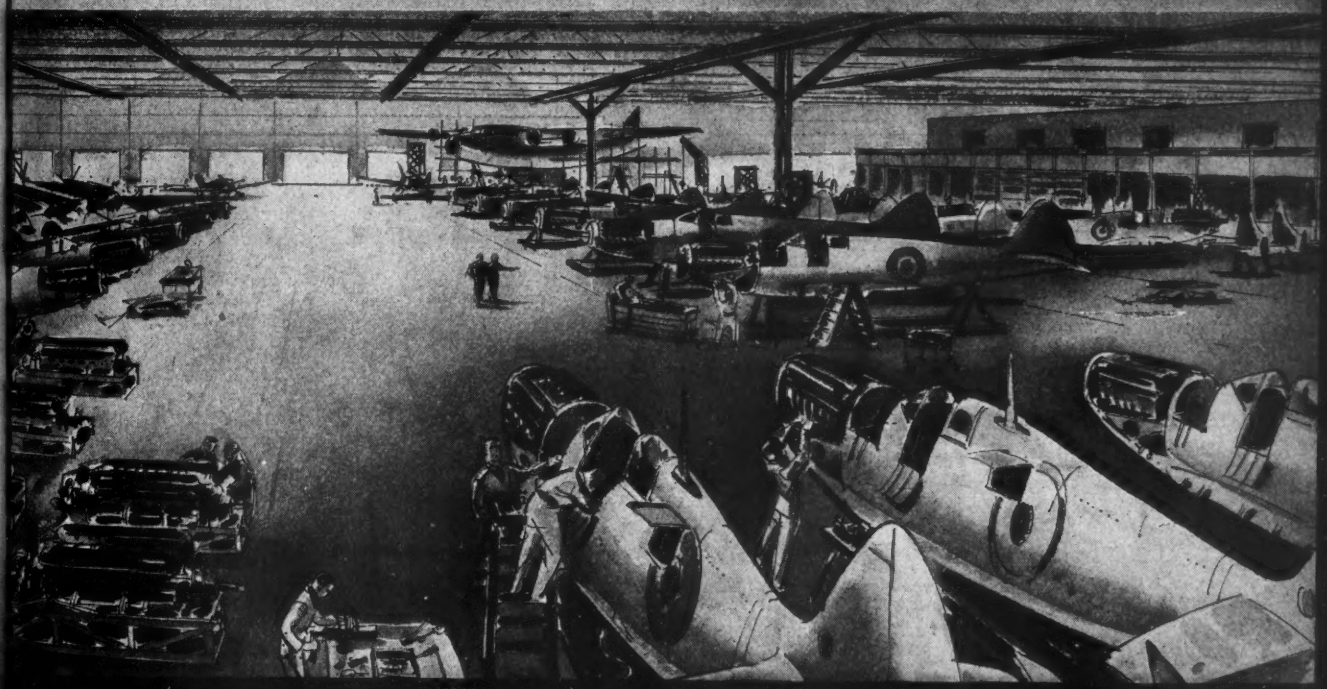
(Concluded on page 214.)

AIR SERVICE TRAINING LTD.
(AIRCRAFT DIVISION)

Britain's foremost aircraft repair & service organisation

THIS ORGANISATION OFFERS ALL THE BENEFITS OF VARIED WARTIME EXPERIENCE FOR YOUR AIRCRAFT REPAIR AND SERVICING PROBLEMS. SKILLED AIRCRAFT TECHNICIANS AND ENGINEERS, AND MODERN EQUIPMENT ARE NOW AVAILABLE FOR

AIRCRAFT REPAIR & MAINTENANCE • CONVERSION • INTERIOR DECORATION



AIR SERVICE TRAINING LTD., HAMBLE, SOUTHAMPTON

British Civil Aircraft

Present Position in Tabular Form : Good Interim Types : The Next Stage

DESPITE the wails of critics even on this side of the Atlantic, we have good reasons for satisfaction, if not, certainly, for self satisfaction, where our civil aircraft are concerned. This is certainly not a time for complacency. We have a very long way to go in our struggles with a peace which, in many ways, is proving to be more difficult than a war.

But within six months of the end of a global war the aircraft industry has managed to put half-a-dozen transport prototypes into the air—two of them entirely "civil"—and have at least the same number of more advanced aircraft in process of construction. For the "interim conversions," such as the Yorks, Lancastrians and various Short boats, there has been all too little praise. Certainly they are modifications of military aircraft, but they are comfortable and largely satisfactory modifications, and are not inferior to any civil aircraft at present available in the world. One day, perhaps, passengers in the extremely fast, up-to-the-minute, pressurised affairs, which are so confidently demanded, may even sigh for the homely roomy comfort of the Yorks and the Sunderlands. And, in the matter

TYPES ALREADY FLYING

Type	Power Units	Span ft.	All-up weight lb.	Max. Wing loading lb./sq.ft.	Max. speed m.p.h.*	Cruising speed m.p.h.	Per cent. Max. power	Height ft.	Total Payload lb.	Range mi.	Speed m.p.h.	No. passengers	Remarks
Avro 19	Two Armstrong Siddeley Cheetah XV	56.5	10,400	22.5	192 (5,000)	155 140 163	64 54 64	3,000 3,000 8,000	1,560 1,170	356 610	155 155	8 6	Civil version of Anson
Avro Lancastrian ...	Four Rolls-Royce Merlin 24	102	65,000	50.1	315 (12,000)	280 290	MWM MWM	11,000 17,500	2,190 4,850 4,850 10,650	4,100 3,640 3,200 2,710	230 230 280 230	6 9 9 13	—
Avro 20 Tudor I ...	Four Rolls-Royce Merlin 102	120	77,000	54.2	346 (20,500)	178 242 283 300	27 59 65 61	10,000 s.l. 12,500 22,500	2,825 5,770 7,810 7,810	4,890 4,230 3,630 3,470	178 178 178 230	6 12 24 24	Designed primarily for Atlantic operations
Avro York ...	Four Rolls-Royce Merlin 24	102	65,000	48.6	298 (21,000)	275 252 200	MWM MWM Econ.	21,000 10,000 15,000	3,080 4,040 5,280 6,800	3,100 3,100 2,600 3,100	200 200 200 200	12 14 24 —	Various passenger arrangements
Bristol 170 Freighter and Wayfarer	Two Bristol Hercules 131	98	36,500	26.0	236 (8,000)	180 150	55 41	5,000 5,000	8,000 10,000 8,475	1,100 550 320	150 150 180	— — 32	Freighter and passenger versions.
D.H. 104 Dove ...	Two D.H. Gipsy Queen 71	57	8,000	23.9	218 (7,200)	150 160 170 195	47 47 47 66	s.l. 5,000 10,000 10,000	1,700 1,975	500 500	160 160	8 —	Smallest "Brabazon" type—5b
D.H. 89a Rapide	Two D.H. Gipsy Queen 111	48	5,750	17.0	153 (s.l.)	130	75	1,000	974	500	130	6—8	Civil version of Dominie
Miles M.57 Aerovan	Two Gipsy Major or Cirrus Major	50	5,800	14.8	127 (s.l.)	112 108	65 57	s.l. s.l.	2,000	400	108	6—10	Primarily for freighter duties. Maximum unobstructed space
Miles M.38 Messenger	D.H. Gipsy Major V or Cirrus Major III	36.2	2,400	12.5	135 (s.l.)	110	—	s.l.	500	330	124	3	—
Miles M.28	One D.H. Gipsy Major 51 or Cirrus Major III	30.7	2,500	15.6	180 (7,000)	169	—	6,400	660	480	155	3	Payload does not include pilot
Percival Proctor VI	One D.H. Gipsy Queen 31	39.5	3,600	18.0	175 (s.l.)	150 157	— —	s.l. 3,600	710 860 544	520 260 780	157 157 157	3 3 3	—
Short Sandringham	Four Bristol Pegasus 38	112.8	56,000	33.0	215 (s.l.)	197 188	RM MWM	4,750 9,000	10,915 8,197 7,820 3,780 4,360	1,270 1,540 1,520 2,280 2,280	162 163 163 166 166	45 24 21 18 —	Civil version of Sunderland. Last figures as freighter.
Short Sandringham	Four Pratt and Whitney R1830/90B Twin Wasps (4)	112.8	60,000	35.6	239 (5,000)	232 203	RM Max. Econ.	6,250 10,250	10,750 6,530	1,750 2,460	176 176	45 21	The "Argentina" was the prototype of this version.
Short Sandringham	Four Bristol Pegasus 38	112.8	56,000	33	211 (s.l.)	194 185	RM MWM	4,750 9,000	10,280	1,420	156	40	Sunderland conversion with faired turrets
Short Solent ...	Four Bristol Hercules 20	112.8	75,000	45	260 (8,000)	238 217	RM MWM	8,400 13,500	11,570 3,320 8,620 4,370	1,000 2,000 1,000 1,500	190 190 190 190	24 24 36 36	—
Short Shetland ...	Four Bristol Centaurus II	150	125,000	47.5	272 (12,000)	255 235	RM MWM	12,800 18,000	11,500 15,400 30,000	3,760 3,590 1,930	190 180 186	46 70 70	—
Taylorcraft Auster	Cirrus Minor II	36	1,850	9.67	126 (s.l.)	100	—	s.l.	407	290	80	3	—
Vickers Viking ...	Two Bristol Hercules 130	89.25	34,000	38.5	270 (10,000)	263 210 171	69 42.5 30.5	10,000 10,000 10,000	7,120 4,855 4,855	1,035 1,725 1,950	210 210 171	21 21 21	Twenty-four seater version also available

* Height (ft.) in brackets.

TYPES IN PREPARATION

Type	Power Units	Span ft.	All-up weight lb.	Max. Wing loading lb./sq.ft.	Max. speed m.p.h.*	Cruising speed m.p.h.	Per cent. Max. power	Height ft.	Total Payload lb.	Range mi.	Speed m.p.h.	No. passengers	Remarks
Airspeed AS—57 Ambassador	Two Bristol Centaurus 57	115	45,000	37.5	300 (18,000)	175 to 285	25 to 50	10,000 to 20,000	6,000 6,700 9,600 11,000	2,000 1,800 1,000 600	240 240 240 240	24 28 40 —	"Brabazon" type 2a
Avro 21 Tudor II ...	Four Rolls-Royce Merlin 102A	120	77,000	54.2	319 (18,500)	221 262 273	MWM MWM MWM	s.l. 13,500 23,000	8,480 9,800 14,200 13,480	2,625 2,475 1,850 1,925	230 230 230 230	34 40 34 60	Provisional figures only in last four columns
Bristol 167 ...	Eight Bristol Centaurus	230	250,000	47.0	300+ (25,000)	250 215	50 40	25,000 25,000	Approx. 20,000	4,500	215—250	72	Engines arranged in pairs, each driving six-bladed contra-airscrews. Second prototype likely to have jet-turbines. "Brabazon" type I.
Cunliffe-Owen Concordia	Two Alvis Leonides	57	11,000	25.4	—	212 190	78 60	8,000 7,000	1,700 2,100	1,000 750	190 190	8 10	Tankage available for 1,200 miles
Handley Page Hermes	Four Bristol Hercules 120	113	75,000	53.27	337 (22,700)	284 254 194	MWM Econ. Econ.	22,700 25,000 10,000	15,950 12,000 8,760 6,270	1,500 2,150 2,690 3,080	254 254 254 254	34 34 34 34	—
Miles M. 60 Marathon	Four D.H. Gipsy Queen 71	65	15,900	31.8	—	210 175	— —	7,000 7,000	3,600 4,540	500 500	175 175	18 —	Maximum still air range 1,000 miles with 13 passengers
Percival Merganser	Two D.H. Gipsy Queen 51	47.8	6,532	20.5	194 (5,000)	152 170	— —	s.l. 8,000	1,150	830	170	5	—
Portsmouth Aviation Aerocar Major	Two Cirrus Major III or D.H. Gipsy Major 31	42	3,950	15.5	167 (s.l.)	153 141	79 65	s.l. s.l.	972 742 416	223 557 1,003	136 136 136	5 4 2	Minor and junior models also to be available

* Height (ft.) in brackets.

of cruising speed, none of our present civil aircraft is as homely as all that. The York's economical cruising speed is 200 m.p.h.—quite a deal faster than most people imagine—while its maximum operational cruising is as high as 275 m.p.h.

The figures in the table above and opposite are the latest available, and have been chosen so that a maximum amount of information can be given. They will be useful for guidance, information and comparison. The table itself is intended, too, as a record of achievement so far—and as a reminder of the work still to be done.

There is not nearly enough "talent" yet to be found amongst the newcomers in the second section of the table. Next time we hope that this section will include, for instance, turbine-powered aircraft types for which definite orders have been placed. Pious hopes cannot be tabulated.

Starting at the beginning of the table we have three Avro types which have been well tested in service—the 19, Lancastrian and York, and the Tudor I, the first production example of which has now been handed over to B.O.A.C. for development testing. A new type cannot, unfortunately, be put straight into service, and it will be many months before the first of the Tudors can be put on the regular Atlantic run. Furthermore, pressurisation and air conditioning are not quite the straightforwardly devised luxuries often so casually expected.

The prototype Bristol 170 has almost completed its development tests and the first passenger version will soon be in the air. This aircraft was designed solely as a freighter and its secondary appearance in passenger form has been dictated largely by demand.

First of the genuine "Brabazon" types to appear, the D.H. Dove is also well advanced in its tests and should be as useful a feeder-line and service-try-out aircraft as the Rapide has been. Though the last is described above as a "civil version of the Dominie," it would be just as true to reverse the sentence, since, after the early days of the Dragon, the Rapide has done, and is still doing, more to make a paying proposition of short-haul airline work than any other aircraft.

In much the same category, though, like the Bristol 170, designed in the first place for freighter work, is the Miles Aerovan.

Although the Short Sandringham and Solents are usually described as "civil versions" of the Sunderland, the latter was originally a military version of the Empire or "C" class boats which made history in pre-war days—so their genealogy is truly civil. Fortunately, the Government is taking a renewed interest in civil flying-boat development, so we may yet see Shetlands and still larger boats on the Empire routes.

Before the end of this year the Vickers Viking will have become the "standard" type for British, European and internal services.

On the Way

Three more "Brabazon" types are among the aircraft on which work is proceeding—the Bristol 167 (familiarly known as the "Brabazon I"), the Airspeed AS-57, and the Miles Marathon. The 167 is something very unusual and interesting both in size and layout, and is intended for the direct London-New York service. It will have an all-up weight of 110 tons and is expected to cruise at 250 m.p.h. while carrying 72 passengers on this crossing. The Ambassador prototype is due out some time during the winter months and is a very modernised version of the twin-engined transport formula.

The Tudor II, the prototype of which should be flying at any moment, is really a shorter-range heavier-load version of the Tudor I, and is intended for the Empire routes. The Handley-Page Hermes is another "interim" type which should soon be flying.

In the table we should have preferred, when giving power percentages for different cruising speeds, to have used the more modern "Maximum Except Take-off," or METO, figures as a basis, but there was a certain lack of standardisation in the figures available. Except where MWM (maximum weak mixture power), RM (rich mixture power), or Econ. (best economical weak mixture power) have been used, the take-off figure has been used as a basis for the percentages.

Quo Vadis?

Naval Air Arm at Cross-roads : Problems of Reorganisation : New Aircraft Operating Puzzles : Tactical Employment Query

By B. J. HURREN

THE fog of secrecy which so long shrouded all to do with naval aviation has remained as an ugly legacy of the war. Now in the grim aftermath it jaundices the views of many who would wish to give full credit if they but knew the facts.

So far, apart from some blatant propaganda booklets issued by the Ministry of Information and some heavily censored books written by private individuals, no comprehensive official review of the great part played by aviation in the Navy's progress to victory has been issued.

IN this thought-provoking article the author reviews some of the formidable problems which confront those responsible for planning the future naval air power.

The recent Portsmouth order referring to the paying-off of all first-line squadrons and re-grouping of second-line squadrons foreshadowed great changes in the "Navy that Flies." The effects of these changes are examined, and some of the operational problems that will arise from the employment of the new types of aircraft are outlined.

Indeed, one not unknown historian who requested Admiralty support and assistance in preparing such a work was informed that it would not be possible to write it, because if the truth were told it would create great friction in Whitehall, and if the truth were not told it would not be a history.

Recently Press accounts have cited an Admiralty policy for the Naval Air Arm, in the shape of an order issued at Portsmouth. The kernel of the statement is: "During the coming months, while the full impact of demobilisation is falling upon the Navy, the policy will be to pay off temporarily all first-line squadrons.

"Considerable regrouping will also be carried out in second-line squadrons. First-line squadrons will be reorganised on a peace basis and will start to reform towards the end of 1946."

The implications of that statement of policy are indeed far-reaching. Few people realise how powerful a force has been built up on the air side of the Navy. If some pessimists see in the terms of the announcement a frittering away of something it has taken a generation to raise—against prolonged opposition from many quarters—and which has proved itself a hundredfold in war, then their Cassandra warnings may not be unjustified.

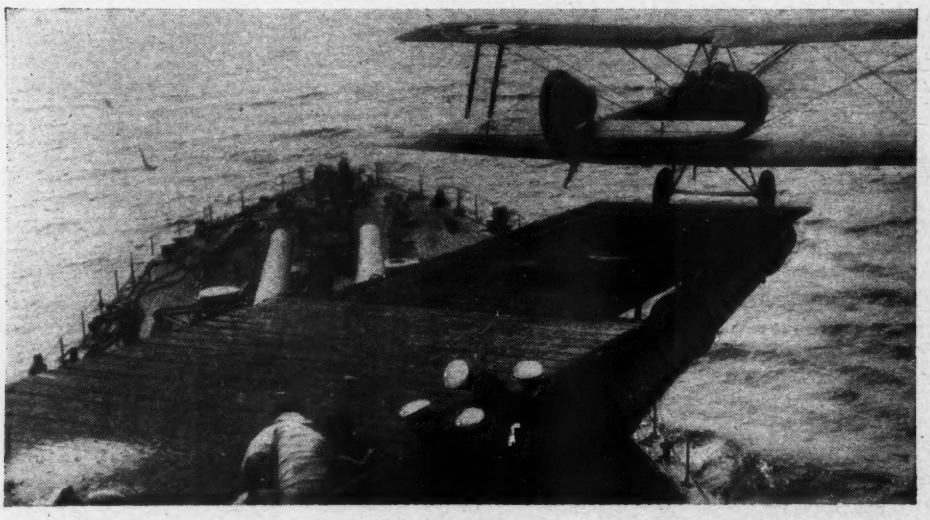
Secrecy may be essential in war; it is the very poison of peace. We may, therefore, hope for a clearer picture to emerge when the position has somewhat consolidated. And if any guide to that end were required, the unequivocal statement by the Secretary of the U.S. Navy that the battleship has been ousted from the position of spearhead of the U.S. fleet might be taken as an admirable pattern for our own progress.

(In parenthesis, since the U.S. Navy is of so much direct concern to us, Mr. Forrestal's provisions are interesting. He says the post-war U.S. Atlantic and Pacific Fleets will be "built round" 13 large aircraft carriers, 13 escort carriers and only *four* battleships. The 26 first-line carriers will muster between them 3,267 aircraft. This, however, is not all, for in reserve will be 18 large carriers and 62 escort carriers and only *seven* battleships. The preponderance given to air power in the U.S. Navy is overwhelming.)

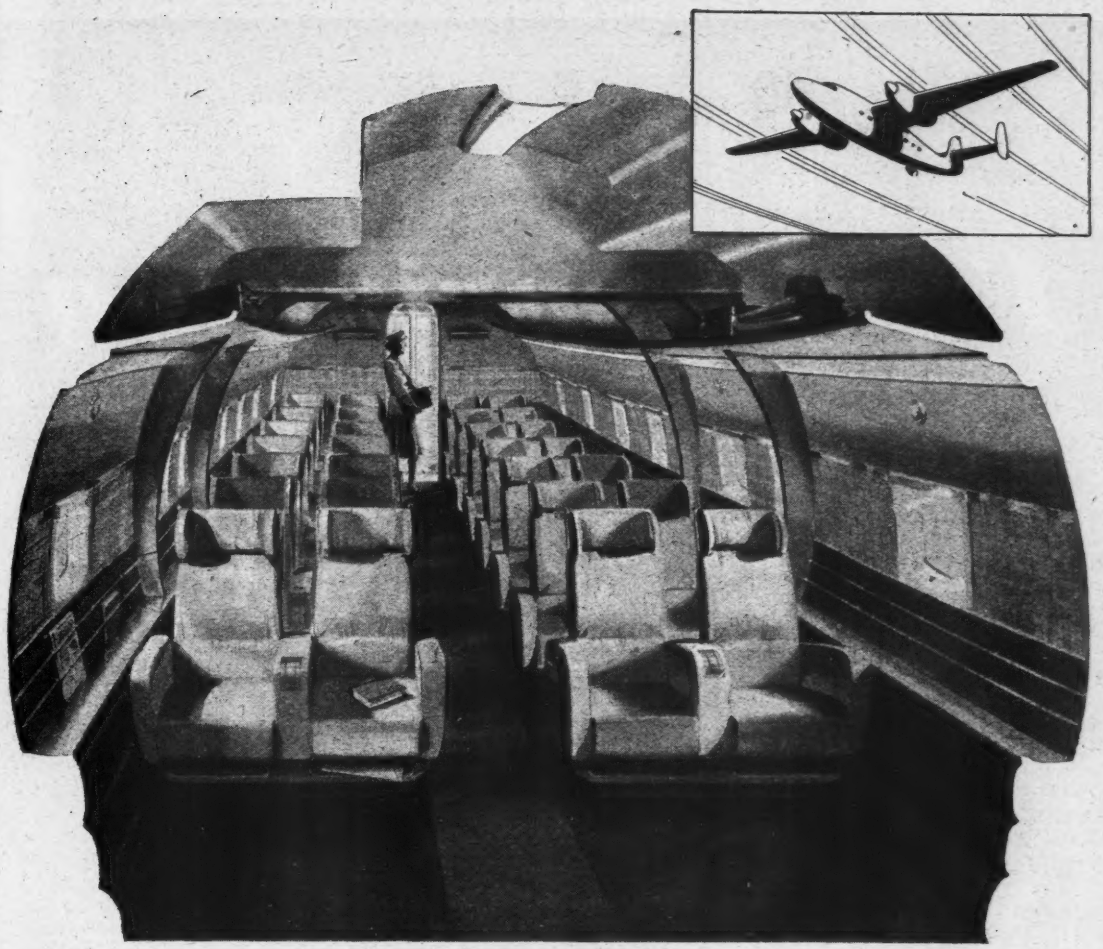
The British Navy attempted to build up its own air power at a time when the verdict on the aircraft carriers was no more than the "not proven" of Scottish jurisprudence. Just before the outbreak of war (September, 1939) it mustered fewer than 200 first-line aircraft, and its man-power was of the order of 2,000 maintenance ratings.

The scope of the advances made can be seen by the fact that at the time of Japan's surrender British first-line strength in aircraft-carrier squadrons was more than 1,300 aircraft, behind which were some 10,000 reserve and training aircraft of all categories. The personnel strength had risen to 70,000.

These figures, whilst not official, are believed to be near approximations. It will be



A REMINISCENCE OF THE EARLY DAYS: Major C. H. Chichester-Smith takes off in a Sopwith 1½-strutter from a gun platform on H.M.S. *Barham*. By swinging the platform outboard, the aircraft was made to face into the relative wind.



Ambassador

28-36 Passenger High-speed Transcontinental Liner

Bristol Centaurus engines driving de Havilland high-efficiency feathering and braking propellers

Designed and now under construction by

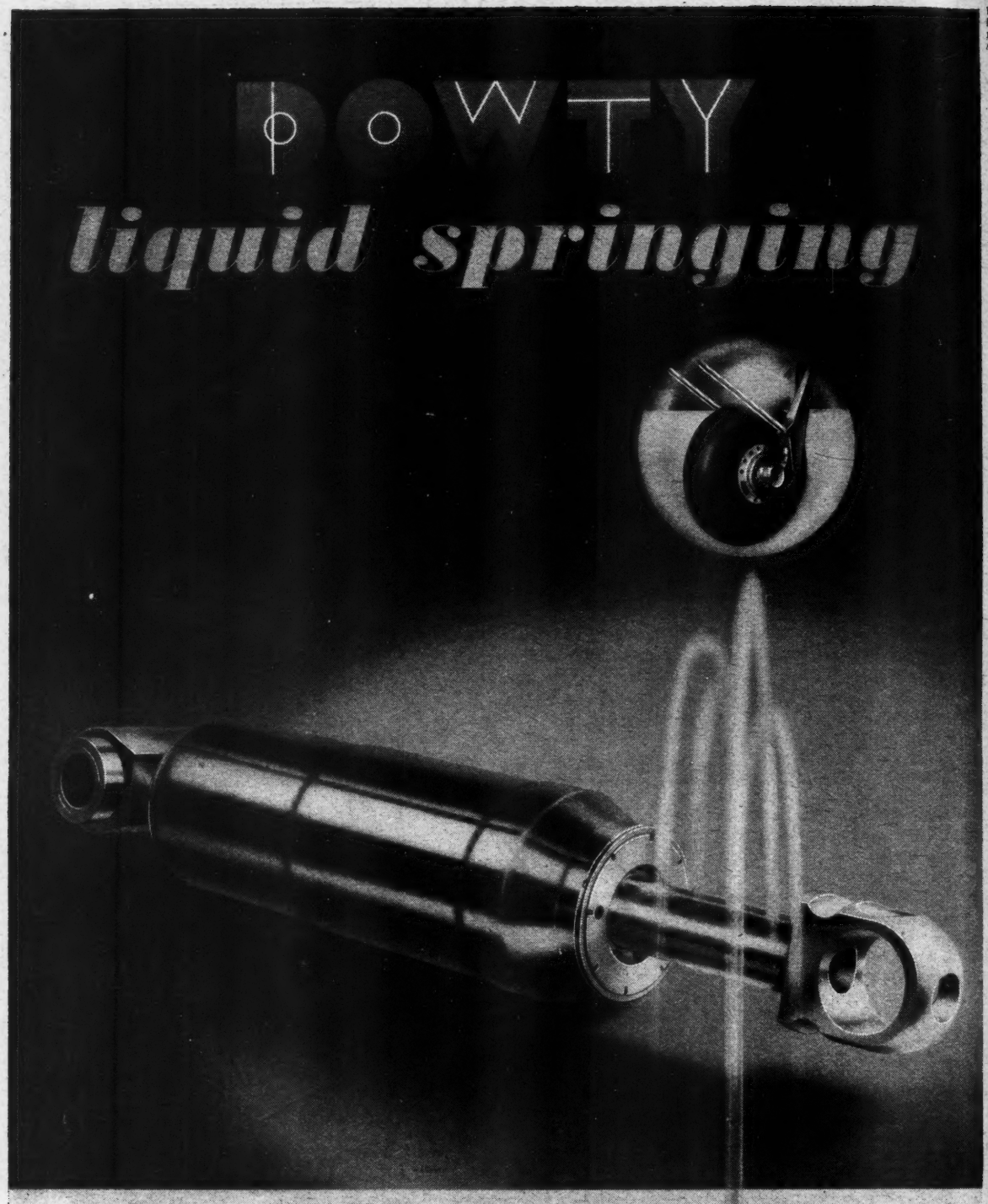
AIRSPEED

Associated Companies in Australia, Canada, India, Africa and New Zealand

FLIGHT
Feb. 28
1946.
Advert.

DOWTY

liquid springing



Dowty Liquid Spring Shock Absorbers provide the ideal springing medium and are operating successfully on Britain's latest aeroplanes

no inflation or maintenance required

DOWTY EQUIPMENT LIMITED, CHELTENHAM, ENGLAND

QUO VADIS?

agreed that to multiply a force some 35 times during the course of a major war is a feat that surpasses even the many major industrial achievements. It was a period of fret, moil and "angst," and the rising tide of successes which finally rounded-off the air war at sea was something of which the Navy personally and the nation as a whole could be proud with every justification.

Ending of Lend-Lease at once brought about for the Naval Air Arm a Lean-Peace. In one swoop more than 30 of the Navy's aircraft carriers were scheduled for return to U.S.A., and although the 14 new light fleets (*Colossus*-type) were coming into being and partly in service before the war ended, the hard core of British sea-air power was reduced to the *Illustrious, Victorious, Formidable, Indomitable, Implacable* and *Indefatigable*. The *Furious*, after decades of faithful service, was sent to the dog-house in the spring of 1945, and the *Illustrious*, after a superb war record, is believed to be earmarked for training duties.

The Lend-Lease arrangements also required the return of numbers of American aircraft, and although (*vide* advertisement!) "eight out of every nine British-made operational aircraft that were delivered to the Navy from all sources were Fairey types," it is plain from a little elementary arithmetic that the return to America made a considerable gap on the Navy's air front.

New Types for the Navy

This gap arrived almost fortuitously in that the end of the war coincided with the emergence of several new types. These have been described in this journal: the Seafang, Sea Fury, Firefly Mk. IV, Spearfish, Sea Hornet and Sea Mosquito. Furthermore, the Vampire was shown to be able to be flown on and off a carrier deck—a point of some interest since the last of the standard strike aircraft of the first war days (the Swordfish) had recently left that very same deck of H.M.S. *Ocean*, although the Vampire was some five times faster than the famous "Stringbag."

The picture emerging is of a trimming of what might be termed war wood in order to introduce a highly specialised and very air-minded Naval Air Arm equipped with aircraft that can match any from shore-based squadrons. In this connection it may be well to direct a spotlight to the fact that every Acting Executive Sub-Lieutenant of the regular service is now required to undertake a six-weeks' air course at Gosport, where the Navy has taken over the old R.A.F. base of Fort Grange.

This 1946 innovation shows all too patently that the need for air-mindedness in naval affairs is appreciated in the highest quarters of the Admiralty. Long ago, midshipmen and sub-lieutenants were required to do a three-weeks' course afloat in a carrier—but this was generally a bit of a picnic party compared with the show now being run at Gosport by Lt. Commander Kirke, R.N.

"*Flight*" photograph.

Lt. Cdr. Kirke, R.N., O.B.E., who is in charge of the new air course at Gosport, getting into a Fairey Spearfish.

The significance of the present air course is that it is included in the curriculum for the "subs" courses, and therefore affects the date of promotion of the sub-lieutenants now entering the Navy as regular officers. The air can no longer be regarded by these officers as a "relief" subject (in the same way as a boy on the classical side of his public school regards that stinkingly absorbing subject called chemistry), but is something to which he must apply himself, albeit setting out on the steps of the great English admirals.

Incidentally, a small but vitally significant fact is that midshipmen are now appointed for sea service to aircraft carriers on exactly the same basis as to other warships; whereas formerly they were restricted to the larger warships and only went, for short periods, to carriers as convenient.

The personnel side will obviously be sorted out far more quickly than the material, and it is on this that the famous phrase "Quo Vadis?" most applies.

The problems which confront those charged with the destiny of the Naval Air Arm are formidable, and patently twice as involved as those which confront the R.A.F. chiefs. This is apparent in the simple consideration of the fact that every technical improvement in naval aircraft requires a complementary adjustment in the ships, which, in effect, are an integral part of the aircraft.

Blowlamps and "Matlows"

Consider, for example, the Vampire. With polished ease it has landed and flown off the deck of a carrier. One Vampire—off one aircraft carrier. But, without in any way depreciating the success of the effort, this feat could easily have been simulated on a runway. In fact, it is common practice to do take-off tests of a new type on a runway, experts being able to calculate with very close accuracy exactly how much deck space will be required for deck landings and take-offs . . . without going near the sea or the ship.

What is much more to the point is how to operate the Vampire from the deck. That hot posterior seems to present an interesting point for Able Seaman Snooks of the deck party. One cannot readily envisage a number of matelots moving freely about the deck with the hot breath of a mechanical inferno sweeping where once the sea breeze blew.

The Spearfish presents almost equally puzzling

aspects. It is too large to be manhandled—a tall man cannot even reach the leading edge of the wings with his hands. The notion of pushing the Spearfish around in the old way seems quite out of the question, and the same applies to the Sea Hornet.

Moreover, the gross weight of these large new aircraft (large by naval standards at any rate) seems to require a stronger form of deck arrester wire and possibly new crash barrier, whilst the size of the lifts of carriers to come—and big 'uns are on the way—is something which the experts in naval construction will have to attempt to forecast accurately side-by-side with the aircraft experts.

Taking the Vampire as the first of the new breed of ultra-fast fighter aircraft and the Spearfish the first of tomorrow's "corvettes of the air," we may with profit attempt to assess their true functions. The killer qualities of the Vampire will be needed at long range to intercept enemy aircraft bearing one of those Hiroshima fireworks. The time will be short indeed since the modern bomb bearer is likely to be far faster than the four-engined class with which the war in the West was in part won. The time spent in bringing the Vampire to take-off position from the hangar may well be too long, as at present understood.

Parking Problems

What is the alternative? Parking ahead of the crash barrier and catapult launching? Parking *astern* of the after lift, thus allowing immediate take-off run, but obliging oncoming aircraft to land over parked aircraft? Mounting on special runway ramps in the style of the platforms over the guns of battleships in 1914-18, using Sopwith Pup? Merely to mention the problems is to indicate no ready solution can be given—for time to get off is the governing factor.

The Spearfish presents equally interesting aspects. Its designed function is for torpedo and bomb work of various categories; but clearly it could well be adapted to carry the radar which is the chief reason for the efficiency of the corvettes, frigates, destroyers and *chasseurs* which are charged to escort the fleet and screen it against the enemy.

In the ships there is a need for considerable numbers of men, whilst the Spearfish with a crew of only two can fulfil all the functions of escort duty with far greater hitting power than any of the small warships and a tremendous economy in manpower. This is particularly evident in the fact that an aircrew could be trained from scratch in less than a year whilst a ship's crew would require, say, ten years to raise the Chief and Petty Officers trained to seamanship.

If, as seems likely, the Spearfish is the first of a new breed of naval escort aircraft, we can contemplate even bigger aircraft in the future, possibly flying much faster and carrying more load. But already, to bear the load of the Spearfish, the designers have been taxed to keep down weight on the undercarriage which, as photographs show, is far removed from the comparatively small affair on the Swordfish and Sea Hurricane which were current when to-day's carriers were coming into service.

As Lord Trenchard Said

It is clear, from this brief review, that the headaches in the Admiralty are not solely due to that stuff which gives a far-away look in nautical eyes, and that the decision to re-group and reorganise the first-line squadrons derives from the basic acceptance of the fact that it is better to be qualitative in the forefront than quantitatively strong yet technically in arrear. This factor governed the outcome of the Battle of Britain and for that matter has applied right back through history to the Battle of Salamis.

It is, therefore, not a matter for despair that the American Navy should be, on paper, so much superior numerically to the British Navy, for the simple reason that the carriers and aircraft now in being may well be found to be demoded in a matter of months when experience under operational conditions has been gained with the new types of aircraft.

From reports so far received the new aircraft coming into the British Navy are markedly superior to any at present equipping foreign Navies, and will form the nucleus on which to found a sure shield by air power at sea in the future.

During the interim months of development, it must be fervently hoped that the big battleship exponents will not unduly sway the high councils of defence, especially as many consider that the sole advantages of the battleship over the aircraft are that it offers appropriate accommodation for the Fleet Admiral and his Staff, and has a nice roomy Quarter Deck for a dance!

THE LATEST MOSQUITOES

(*Concluded from page 208*)

of production. The Mark 16 was the aircraft which, with almost monotonous regularity, carried 4,000-lb. bombs to Berlin, and the 35 can also carry various bomb loads up to 1×4,000 lb. Two 50-gallon drop tanks are normally fitted, but if a smaller weight of bombs is carried, larger wing drop-tanks may be used. The normal fuel capacity is 597 gallons, and the all-up weight is 25,200 lb.

Mosquitoes with Merlin 114s are appreciably nose heavier, chiefly due to the increased length of the engines (some 9in.); however, even with no bomb load to balance this up, the aircraft have lost nothing of their pleasantness of handling, and the larger balance-weights which have been fitted to the elevators give them a more solid feel. A Mosquito characteristic which might well have been lost by now, but still seems to persist, is the difficulty, in most aircraft, of adjusting the throttle friction nut to anything between "slip" and just about "solid"; one therefore has to accept a temporary power drop—usually uneven—on the initial climb, as hands are changed to select "wheels-up."

The engines themselves, by comparison with the early 21s, 25s, or specially 225s, are particularly crisp and responsive, and there is very pleasant build-up of power on take-off.

COMMUNAL CLUB

BY the simple means of giving the entire organisation "amateur status," the Gloucester Flying Club hope, in due course, to offer flying at very low rates. The rule of the club is, and will be, that there shall be no financial gain to any individual—whether instructor or engineer—and that, consequently, the final cost of flying will be basic. The whole thing is being run by and for amateurs—though it remains to be seen whether such a Utopian arrangement is possible in this cold, hard world.

For the moment the Club, whose honorary secretary is Sqn. Ldr. L. Andrews, of 30, Armscroft Crescent, Gloucester, is concentrating on ground instruction, but efforts are being made to obtain the use of Staverton airfield, which is still, unfortunately, in Service hands, and negotiations with M.A.P. are in progress for the purchase of three Tiger Moths and a Link trainer. Meanwhile the club has purchased a Gladiator for ground instructional work.

THE HANDLEY PAGE HERMES

Complete

furnishing, decoration, thermal insulation, soundproofing and passenger services

by

RUMBOLD

THE SPECIALISTS IN COMFORT ENGINEERING

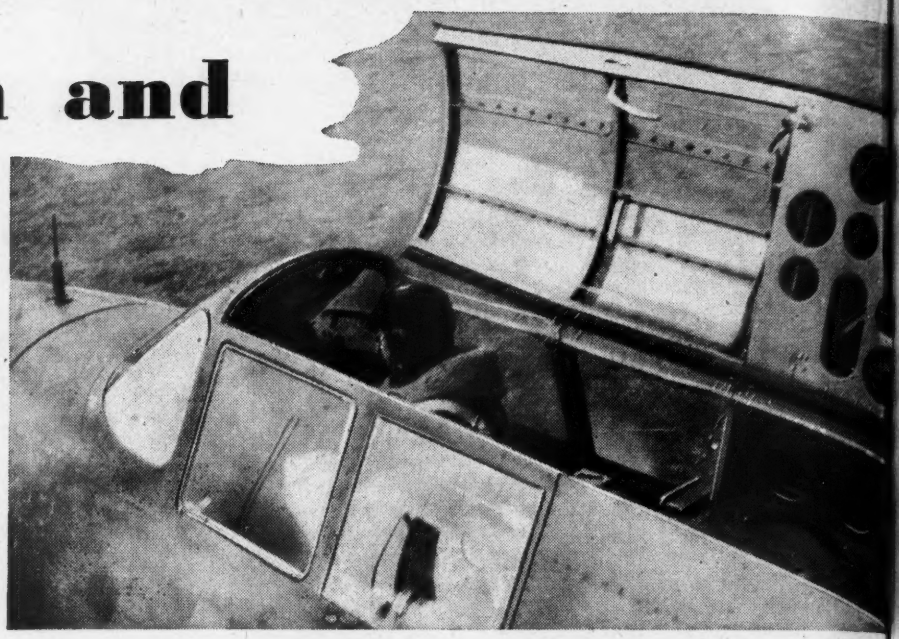
L·A·RUMBOLD & CO. LTD KILBURN N.W.6

IN THE AIR—X

Boston and Havoc

Memories of Early Tricycle Days : Outstanding American "Lease-Lenders"

By "INDICATOR"



ALTHOUGH the Douglas DB-7 (alias A-20, P-70, Boston and Havoc) was not the first type I had flown with a tricycle undercarriage, it was certainly my first full-size aircraft with this layout, and was rather startlingly impressive following, as it did, such mild devices as the Scheldemusch, the Stearman-Hammond and the G.A. Cygnet of pre-war years. In those early war days nearly all of us still suffered from the chronic illusion that a tricycle was designed largely so that the aircraft could be flung carelessly on the ground under all sorts of conditions, and so that it would not tip up when full braking power was thereafter applied.

It was only later that we all discovered how very much shorter landings could be made by using "stall-drag" rather than braking tyre-drag, and that the very real beauty of the tricycle arrangement lay in its magnificent directional stability while running on the ground. Not that this stability was so very noticeable in our early unfamiliarity with American-type toe brakes and without the proper use of a control lock which could be applied from the driver's seat. The castoring nose-wheel just shot from one full lock to the other as the brakes were unevenly applied during over-slow and over-cautious preliminary taxying, and it was extraordinarily difficult, with free controls, to apply any sort of accurate individual pedal-rocking when the rudder pedals as a whole would try to move off, one way or another, at a touch.

Experience taught us very soon that, regardless of watching Control Officers and Wing Commanders Flying, fast taxying was the real answer and that a locked rudder made the business easier still. The Douglas DB-7 control lock consisted of a hook affair protruding from the dashboard; under enormous safety-spring tension it had to be pulled out and attached to the column to produce the necessary result.

I often wonder whether the Boston-Havoc combine ever received the praise due to it as an outstanding flying machine. Since a military aircraft must do rather more than fly fast and handle well, it is rather doubtful. The Boston was not a very practical bomber and the Havoc never got into its stride as a night fighter. But nobody will deny that the type was one of the nicest medium twins of the war.

To the beginner it was, perhaps, somewhat complicated, with its dual gill control (for upper and lower cowling sections) below and on the right; with its three-position undercarriage lever and flap lever below and on the left; and with its multiple fuel system and tank balance cocks. I remember once on a long cross-country, playing tunes on those balance cocks in an effort to even out the tank levels. In those days a great many of our Bostons had been diverted from the French after their collapse, and the instruments were, to us, most unintelligibly calibrated, though, fortunately, most of the throttle controls had been modified to a forward-to-open movement. Heaven knows why some of the European countries preferred throttles which had to be pulled back to open. With no automatic boost controls or stops, and with gauges marked in mysterious units, we never really knew how many inches were being fed to the engines, and my first take-off must have been very frightening to watch since I used very nearly the whole throttle range. It was only the effect of the unreasonably competent acceleration which caused me to realise the worst and to reduce boost before one or both engines actually disintegrated.

Conventional Advantages

On that first flight of mine both the take-off and landing was executed off and on grass airfields. Even then it was obvious that the tricycle is not at its best on any surface which is not smooth and hard, and that the real advantages of the arrangement tend to be lost in any other circumstances. The take-off was bumpy enough to make me wonder about the strength of the nose-wheel installation, and after the landing I was quite unable to take advantage of the braking possibilities since the main wheels simply locked on the wet grass and tore up some of the proud Station Commander's excellent turf. Although I am very much in favour of the tricycle for "civilised" conditions, we must not go quite mad about it, since there are many routes and circumstances in which the old-fashioned layout has the

advantage on the score of greater landing drag, increased general safety and lower maintenance costs.

One of the operational faults of the Boston was that there appeared to be no means of bodily communication between the various compartments. Certainly the bomb aimer in the nose was locked in his little cell irrevocably for the duration of any flight. I believe the first and possibly the only A.T.C. cadet to abandon ship by parachute was riding in that compartment when a Maintenance Unit test pilot found that the undercarriage wouldn't come down. Since the cadet couldn't climb out and go anywhere else, and the nose portion would have been more than a little vulnerable in any belly-landing, the pilot (no doubt to the cadet's immense delight) ordered him to step out forthwith.

Hydraulic-less

With those first Bostons there was no final emergency system for undercarriage-lowering—merely engine pumps and a reserve hand-pump in the cockpit. If the hydraulic fluid had somehow fled away one was left sitting in space and feeling rather foolish with a wholly undamaged aircraft about to become a partial write-off through no fault of one's own. On one occasion I spent the better part of half an hour orbiting an airfield while I wore out the muscles of my right arm in an effort to obtain some of the services with the hand-pump, which seemed to be working on a succession of air locks. The engine pumps had previously failed to produce any noticeable results and had not even retracted the undercarriage fully.

I "got" the undercarriage and most of the flaps in due course, but I was then left with the somewhat nasty combination of a tricycle aircraft and no brakes—these being, as usual, worked off the same system. So I did one of the slowest recorded approaches on the longest uphill runway available, touched down heavily tail-first and ran the Boston into the rough, using what remained of the rudder control. It transpired that the hydraulic tanks had been nearly empty and that I had been working hard on little more than bubbles and faith. I still wonder what the passenger in the rear gunner's position thought about it all; we had no inter-comm. Later versions had, if I remember correctly, an emergency compressed-air bottle for the undercarriage system, with separate pipelines.

The incident did much to rid me of any sneaking suspicion that a tricycle, flung on to the ground, could be stopped in a shorter distance with the brakes than could a brakeless and conventionally landed aircraft when fully stalled. That landing with the Boston was very much shorter than any other I had made with the type—and would have been shorter still if some slight braking power had been available to resist the final helpless dawdle before the engine cut-outs were used. Yet some pilots are probably still convinced that a half-braked "wheeler" is the best way of dealing with a mild overshoot, and still instinctively try to make contact as soon as possible rather than to hold the aircraft off the ground as long as possible while taking full advantage of the tail-down drag.

There was one rather curious feature of the Boston's take-off which I have never fully understood. As with nearly all tricycles, it was necessary to pull it off the

"Flight" photograph.

The Douglas Boston (DB-7) day bomber, originally powered by two Twin Wasps and later by two 1,600 h.p. Wright Double Row Cyclones. As a day bomber it carried 1,000 lb. of bombs and had an all-up weight of about 20,000 lb.

MORREX
MORREX Rotary Industrial Wire Brushes are made from a high grade steel specially treated to ensure a stiff and uniformly sharp abrasive surface which wears evenly without crystallising, bending or breaking.
There is a size and type for every job, and complete lists will be sent on application.
B. O. MORRIS LTD.
SHIRLEY BIRMINGHAM
(Manufacturers of Morrisflex Flexible Shaft Equipment)
MORREX

BOSTON AND HAVOC

ground when adequate speed had been obtained, and one then hoicked the undercarriage lever smartly through its gate. As the legs went up, and with the aircraft still in a somewhat tail-down attitude, it seemed to sink back on to the runway and had to be held in the air by main force until it had gathered more speed. No doubt the undercarriage movements upset the c.g. position, but the effect was exactly as if one had accidentally raised the flaps—so presumably the airflow was also being shifted.

The Havoc two-seater night fighter was a British conversion of the Douglas Boston. The Mark II had twelve .303in. machine guns in the nose. Maximum speed was in the region of 300 m.p.h.

The DB-7, as it was originally designated, was, in fact, one of the few aircraft to see the war through more or less from start to finish. The first examples appeared early in 1940, or even, perhaps, before, and the last U.S. examples were still doing good work at the end of the European war.

Tactical Air Forces

Review of Their Role in Modern Warfare

AIR MARSHAL SIR ARTHUR CONINGHAM, K.C.B., D.S.O., M.C., D.F.C., A.F.C., lectured to the Royal United Service Institution on February 20th on the Development of Tactical Air Forces. Marshal of the Royal Air Force, Lord Tedder, G.C.B., was in the chair. Looking back briefly at history, the lecturer said that in 1914 the Army had at least got something which "could look over the hill." Air doctrines, however, developed rapidly, and by 1917 the R.F.C. was photographing, bombing, spotting for the guns and fighting furiously in the air. Between 1919 and 1939 there was not much doing. The chief happening was the reduction of our Forces, with emphasis laid on quality in what we retained.

In 1939 the news from Poland showed that the tempo of German warfare had been worked up. The Stuka at first made a great impression, but our Air Marshals declined to be rushed. In due time our fighters simply ate the Stuka, but the Germans, with characteristic obstinacy, kept on using it.

There the Air Marshal paused to give the piece of advice that before you use a new weapon you should always consider what the antidote will be.

Then the Air Marshal talked about the Middle East in 1941. We had had victory in East Africa, while the reverses in Greece and Crete were things of the past. When Coningham arrived there, Sir Arthur Tedder (as he then was) told him to "get together" with the Army Commander; so he joined with the General in sharing a headquarters in the desert. Before long the Air Force began to feel that it would soon get air superiority and keep it; but the entry of Japan into the war reduced our strength in the Middle East. At one time the strength of our fighters was down to 14.

From the first Sir Bernard Montgomery understood the nature of air problems, especially that to gain air superiority was the first necessity of any operation. After the breakthrough at Alamein on November 4, 1942, the Air Force, by then reinforced by some American squadrons, had to hurry forward along the coast, not only to support the advancing 8th Army, but to give cover to a convoy which it was absolutely necessary to run through to Malta. The Army gave splendid help in clearing airfields.

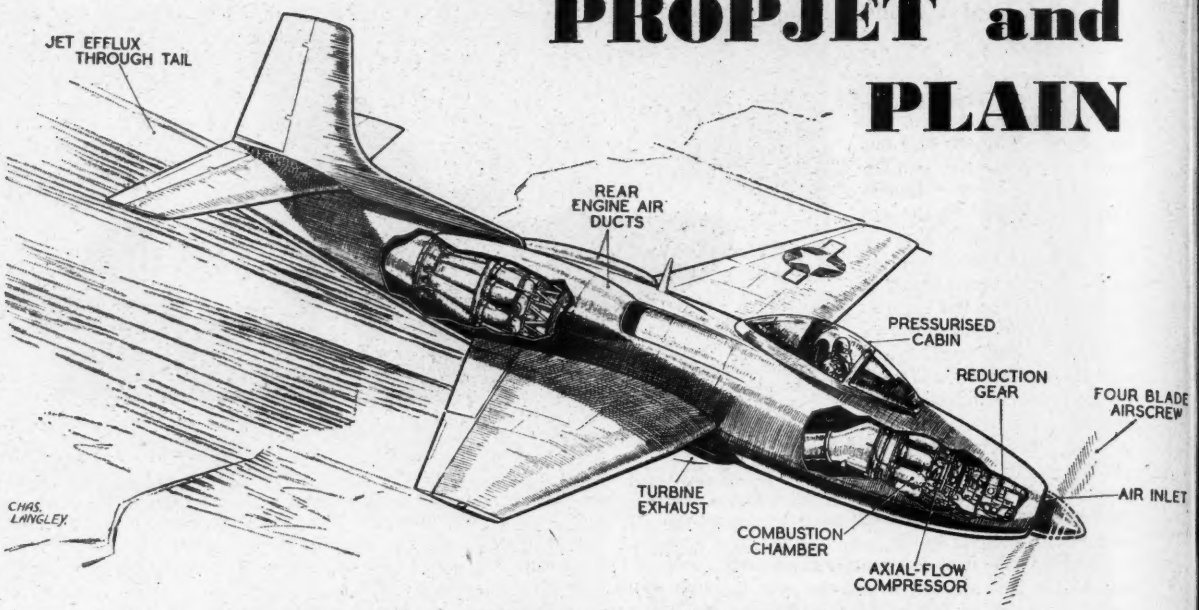
In Sicily the Army-Air Force machine worked perfectly; but the Germans learnt to fight without air support. At Messina we learnt one lesson, namely, that air power could not cut a narrow line. Here it may be remarked that in the subsequent discussion Air Chief Marshal Sir Guy Garrod quoted the example of the River Po to support his belief that, given sufficient time, air power could deny the passage of a river to an enemy.

When it came to preparing for the invasion of Normandy, Sir Arthur said that after years of air-to-air fighting, our pilots had to be trained to think of what was happening on the ground below them. Again Sir Arthur remarked that the Germans grew expert at fighting without air support. In spite of the great slaughter that our air forces wreaked, the enemy succeeded in extricating the majority of his troops out of the Falaise pocket. Then he got two-thirds of them away across the Seine.

Of the Air O.P. squadrons, the Air Marshal said that they became the ideal instrument for directing the fire of the guns on to enemy positions; but of course they could only work in conditions of air supremacy.

Drawing-up some final lessons, Sir Arthur said that senior Air Officers must "know their stuff," and must be ready to stick up for their opinions in council, where they are usually in a small minority. It was not necessary for the G.O.C. and the A.O.C. to share one dwelling, but they should live within easy meeting distance of each other. Speaking of the intervention of heavy bombers in a tactical battle, Sir Arthur said that they did very good work when they dropped fragmentation bombs (for which we had to thank the Americans) on concentrations of troops, and when they attacked communications; but the demolition of Cassino and other places did no good to the Army, and the destruction of villages often held up the advance of our troops. Finally, it was only natural that a General should have his front line chiefly in his mind; but an Air Officer should always be thinking of the need to harry the enemy far behind his battle line.

PROPJET and PLAIN



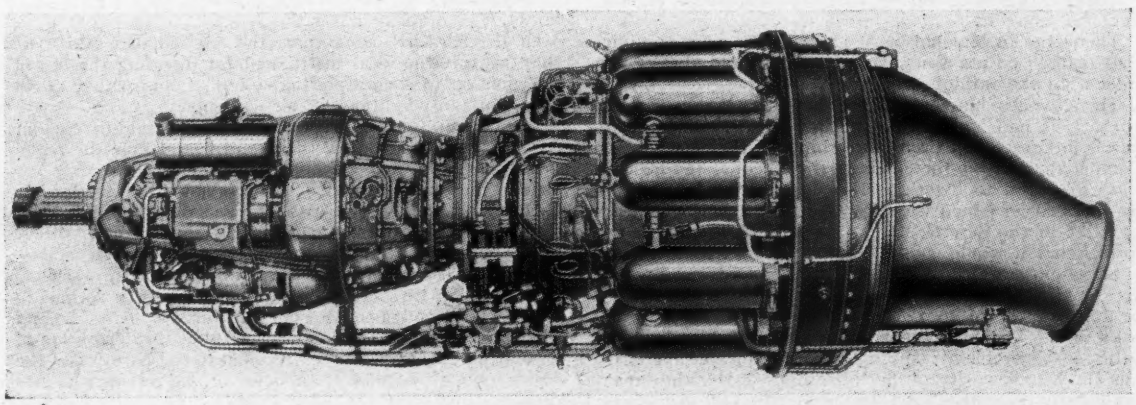
Consolidated-Vultee XP-81 Combines Turbine-driven Airscrew and Plain Jet Propulsion

CLOSELY following upon the release of particulars of the Ryan FR-1 Fireball fighter, in which a reciprocating engine drives a tractor airscrew while a jet unit is mounted in the tail, comes details of another American experimental type with a similar jet in the tail, but with its tractor airscrew driven by a gas turbine. This is the XP-81, a photograph of which was published in our issue of February 7th, designed and built by Consolidated-Vultee and now undergoing flight trials at the Muroc Army Test Base in California. So far, performance figures have not been divulged, beyond the statement that the speed is "more than 500 m.p.h." It ought to be very considerably in excess of that figure in view of the statement that "the combination of power units can produce virtually as much power as all four engines of a B-29 Superfortress."

The XP-81 is very far from being a small aircraft. It has a wing span of 50ft. 6in., a wing area of 425 sq. ft. and a gross weight which still appears slightly uncertain since the Vultee release gives it as 19,500 lb., while the General Electric Company, who should know the weight of its power plants, states that it weighs "22,000 pounds, including both of the powerful engines." The machine was designed primarily as a long-range bomber escort, for which purpose obviously the lowest possible fuel consumption was necessary, hence the turbine-driven airscrew. The take-off is also, of course, greatly improved by the greater thrust obtainable from an airscrew at low forward speeds. For cruising over long ranges, the machine cruises on the turbine-driven airscrew alone, and in the main the rear jet is used only when very high speed is desired.

Push-pull Propulsion

Within a well streamlined fuselage are housed the two power units, the pilot being situated above and slightly aft of the forward one, which is a General Electric TG-100, of the axial-flow compressor type. The rear unit is a General Electric I-40 similar to those used in the Shooting



Propjet is the name given by the General Electric Company of America to this type TG-100 turbine-airscrew combination, used in the nose of the Consolidated-Vultee XP-81 shown in the artist's impression at the top of the page. The compressor is of the axial-flow type.

Star, with radial-flow compressor. Apart from the airscrew of the front unit, a certain amount of jet propulsion is obtained from the turbine exhaust pipe which projects through the belly of the fuselage approximately amidships.

First Tested with a Merlin Engine

An interesting feature of the development work which has gone into the XP-81 is that before the TG-100 unit was installed, the machine was tested in flight with a Merlin engine mounted in the nose. In that form, therefore, the Vultee was basically similar to the Fireball. The installation of the two turbine units is indicated in one of our illustrations. The TG-100 unit is much more powerful than the Merlin, but of lower specific weight, and so the weights of the two units may have been sufficiently alike to bring the c.g. into the correct position with either. The weight of the I-40 unit so far aft has obviously made it necessary to push the front unit farther forward than is usual in relation to the wing, hence the long nose of the XP-81. It would be interesting to know the effect of this on directional stability. The fin and rudder do not appear to be above normal size to counteract the forward "fin effect" of the long nose and the large four-bladed airscrew.

The wing is of orthodox design so far as its plan form is concerned. Its aerofoil section is one of the N.A.C.A. laminar-flow types, and in order to get the wing surface as smooth as possible, the skin is of heavy gauge so that no dimpling occurs at the rivets, the heads of which are milled. In this way, it is claimed, no painting or other treatment is necessary to fill-in depressions. The heavy-gauge plating is applied to the forward 34.5 per cent. of the wing chord and forms, with spar and leading edge, a torsion box extending to the centre line of the fuselage. The trailing-edge portion of the wing is a somewhat lighter structure and carries equipment, ailerons and flaps. Thermal de-icing is used for the wing and tail leading edges, and is provided by the heat from the TG-100 exhaust.

Structurally the fuselage is of orthodox type, with semi-monocoque construction and flush-riveted skin plating. A bubble-type canopy covers the pilot's cockpit and is arranged to slide back, either to the extreme of its travel or to intermediate stops. A device is under development for catapulting the pilot from his cockpit in case of emergency. The pilot's cabin is pressurised by the air from the TG-100 compressor, and refrigeration is also provided so that conditions can be kept comfortable regardless of altitude or climate. An automatic pilot is installed, in view of the long ranges for which the machine might be used.

The large air scoops in the sides of the fuselage supply the I-40 jet unit in the tail. The TG-100 obtains its air through an annular scoop around the airscrew reduction gear. The normal supply of fuel for the two power units is carried in internal tanks located just aft of the pilot's compartment. For long-range operation provision has been made to carry external drop tanks.

Design of the XP-81 began in September, 1943. The first test flight with the Merlin installed in the nose was made on February 11th, 1945, and the first flight with the TG-100 unit on December 21st, 1945. A British Meteor with Rolls-Royce Trent units driving airscrews flew before this.

HAPPY LANDINGS

AS part of a drive against accidents in the R.A.F., the Directorate of Accident Prevention has produced the first number of a monthly publication called *Happy Landings*. In a foreword, the Chief of the Air Staff, Lord Tedder, says, that now the war is over the R.A.F. will have fewer aircraft, and most certainly none to waste. The last ounce must be got out of what the R.A.F. has, and, therefore, the accident rate must be drastically cut down.

The publication which, incidentally, introduced the R.A.F.'s "Safety Pin-up" Girl, Prudence, is handsomely produced with the use of colour and reflects much credit on its originator, Air Commodore A. C. H. Sharp, D.S.O., who is the Director of Accident Prevention.

HELIUM-INFLATED TYRES

IT is reported that the Goodyear Tyre and Rubber Company have, for the first time, successfully applied Helium to the inflation of aircraft tyres. The chief difficulty in the use of Helium for inflation is that it diffuses too rapidly through natural rubber, but this problem has been solved by using Butyl synthetic rubber inner tubes. Helium diffuses through this material only a quarter as fast as through natural rubber, or 67 per cent. as fast as air through natural rubber.

It is calculated that, on an average, approximately 92 lb. of air is required to inflate a 11oin. tyre, but that only 13 lb. of Helium is needed. This shows a saving of 158 lb. for the main wheels of each aircraft, irrespective of any weight saved by using Helium for the nose or tail wheel.

This new development would seem to have a considerable value, for it has been estimated that each pound of weight saved in commercial aviation is worth about £25 over the year in passenger and freight revenue. On this basis, a saving of approximately £4,000 would be effected in the case of each large aircraft in a single year.

S.M.A.E. ANNUAL DINNER

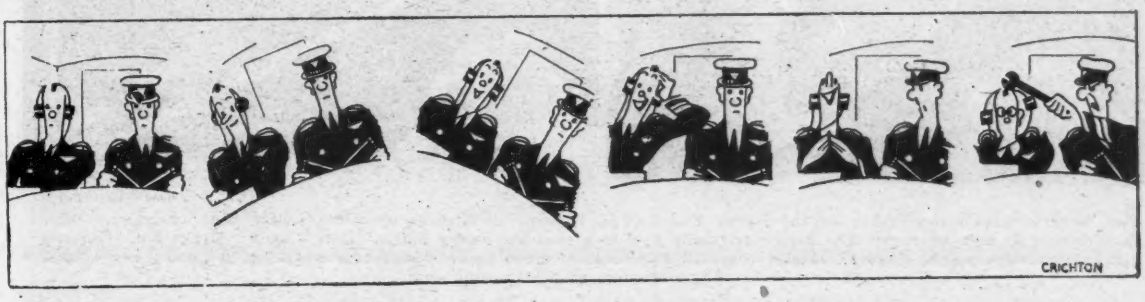
THE Society of Model Aeronautical Engineers held their annual prizegiving, dinner and dance at the Lysbeth Hall, London, W., on Saturday, February 16th, and it was attended by over 200 members, the guest of the evening being Sir Frederick Handley Page.

Mr. A. F. Houlberg occupied the chair, and after the toast to the King Mr. M. R. Knight rose to propose "The Guests" and referred to Sir Frederick as an outstanding personality in the aircraft industry. His interest in the tailless type of aircraft was evinced by his sponsoring of an S.M.A.E. contest in 1945 for models of this type, and the Society was very grateful for his assistance and moral support.

Another prominent guest was Mr. F. J. Camm, journalist, brother of Mr. S. Camm, the Hawker designer, and among the many well-known model aircraft enthusiasts were Mr. A. Judge, who went to America at the age of 19 and won the Wakefield International Trophy for Great Britain, and Mr. R. N. Bullock, another Wakefield Trophy winner, who obtained the cup in 1929 with a low-wing model.

Sir Frederick Handley Page, who presented the prizes, expressed the opinion that in model aircraft there were great possibilities for the future, and the adventurous spirit prevailing was the same as that which encouraged the early pioneers to surmount their difficulties. He stressed the importance of the research side, which enabled flight characteristics to be judged and tests made with model aircraft from which could be obtained useful data for their full-scale counterparts. Sir Frederick added that he would like to see at some future date a speed trophy for models on the lines of the famous Schneider Trophy.

AIRSTRIP . . . No. 3



Air Survey of West Africa

Expedition to Gold Coast, Nigeria, Gambia, Sierra Leone

By MAJOR F. A. de V. ROBERTSON, V.D.

IN the issue of February 14th last, we published an account of the photographic survey now being carried out by the R.A.F. of the United Kingdom. The photographic side of the Service is also about to embark on another survey of very great interest but of a totally different character. It is an old cliché that the sun never sets on the British Empire. It follows almost inevitably from that fact that nobody knows all that there is to know about that Empire, and that there are parts of it of which the knowledge is all too scanty.

The West African colonies come under that heading. Parts of Nigeria, the Gold Coast, Sierra Leone, and Gambia have been surveyed on the ground; but really comprehensive surveys of those colonies are non-existent. Nobody is to blame for that. Much of the country is forest and could only be properly surveyed from the air. It is only within very recent times that an air survey has become possible. But now the Colonial Office has arranged with the Air Ministry for such a survey to be undertaken. Even yet things are not so simple as one could wish. The R.A.F. possesses plenty of pilots who have much experience in photographing for the purpose of making mosaics of enemy defence lines. But a still higher degree of accuracy is needed for a photographic survey of practically unknown country, where there are no ground "fixes." Fixes can be established by radar, when the aircraft is apparently lost in the blue; but the pilots who work it need to be experienced and carefully trained men. A number of pilots are now going through a course, in order to discover which are skilled enough to undertake this work.

In addition to the difficulty about pilots, there is also a problem about aircraft. One would imagine that the R.A.F. had enough and to spare, especially when one reads of unwanted machines being dumped in the sea. But what the survey party would prefer is twin-engined machines like Dakotas, and of them there is no surplus. They are all busy. So the survey party has to accept Lancasters. The type is not ideal for survey work. A four-engined machine is unnecessarily extravagant, and unnecessarily large. Six machines of this type have been handed over to the survey. Four of them are going out with the first party, while two are being held in reserve in this country to be fitted with the radar equipment. There are, of course, tracts where ground controls can be arranged.

The Gold Coast is the colony which is to be tackled first. The base of the expedition is to be at Takoradi. During the war it was developed as a station for receiving aircraft from the American continent and despatching them across to East Africa and the Middle East to play their part in the great campaigns of Wavell and Montgomery.

145,000 Square Miles

The R.A.F. survey organisation reckons to be able to photograph 80,000 square miles per annum for the next ten years; but it hopes to be able to improve on that. The Colonial Office has drawn up a provisional list of 145,000 square miles which it wants surveyed. That means nearly two years' work at the present estimate. It includes all the four colonies. Only selected areas are to be surveyed, and the Colonial Office has made out a list of priorities. Areas to be surveyed include those suitable for hydro-electric schemes, gold mining, water supplies, forestry, geology, and the making of new maps and the revision of old ones. Nigeria has some sociological problems, as it is over-populated in some parts. Soil erosion in the Gold Coast needs to be studied, and in the same colony there is a campaign against trypanosomiasis—which is a parasite that causes sleeping sickness in human beings and tsetse disease in ruminant animals.

R.A.F. photographers are going out to Takoradi, and a ground party will be accompanied by Col. Humphries of the Colonial Office, who will investigate ground survey requirements. The heavy equipment has already been despatched by ship, and it is hoped that the party will leave in the middle of March.

FORTHCOMING EVENTS

March 1st.—*Akroyd-Stuart Lecture, Nottingham.

March 4th.—*James Clayton Lecture, Newcastle.

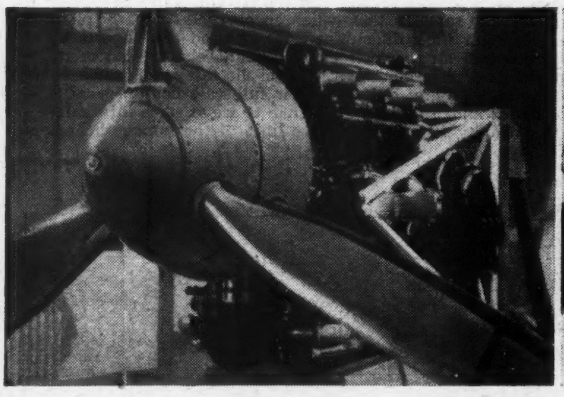
March 12th.—R.Ae.S., Belfast branch; "Model Tank Testing of Flying-boat Hulls and Floats," by L. Smith.

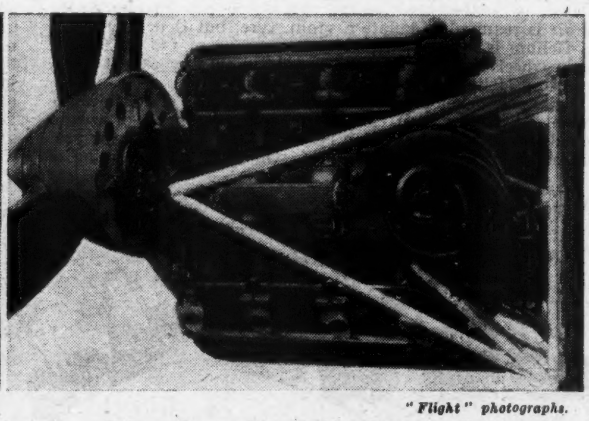
March 28th.—R.A.F. Club annual meeting at 128, Piccadilly, London, W.1, at 6 p.m.

April 4th.—*Metropolitan Region luncheon meeting, Institute of Motor Industry (London).

April 25th.—*R.Ae.S., Manchester Branch.

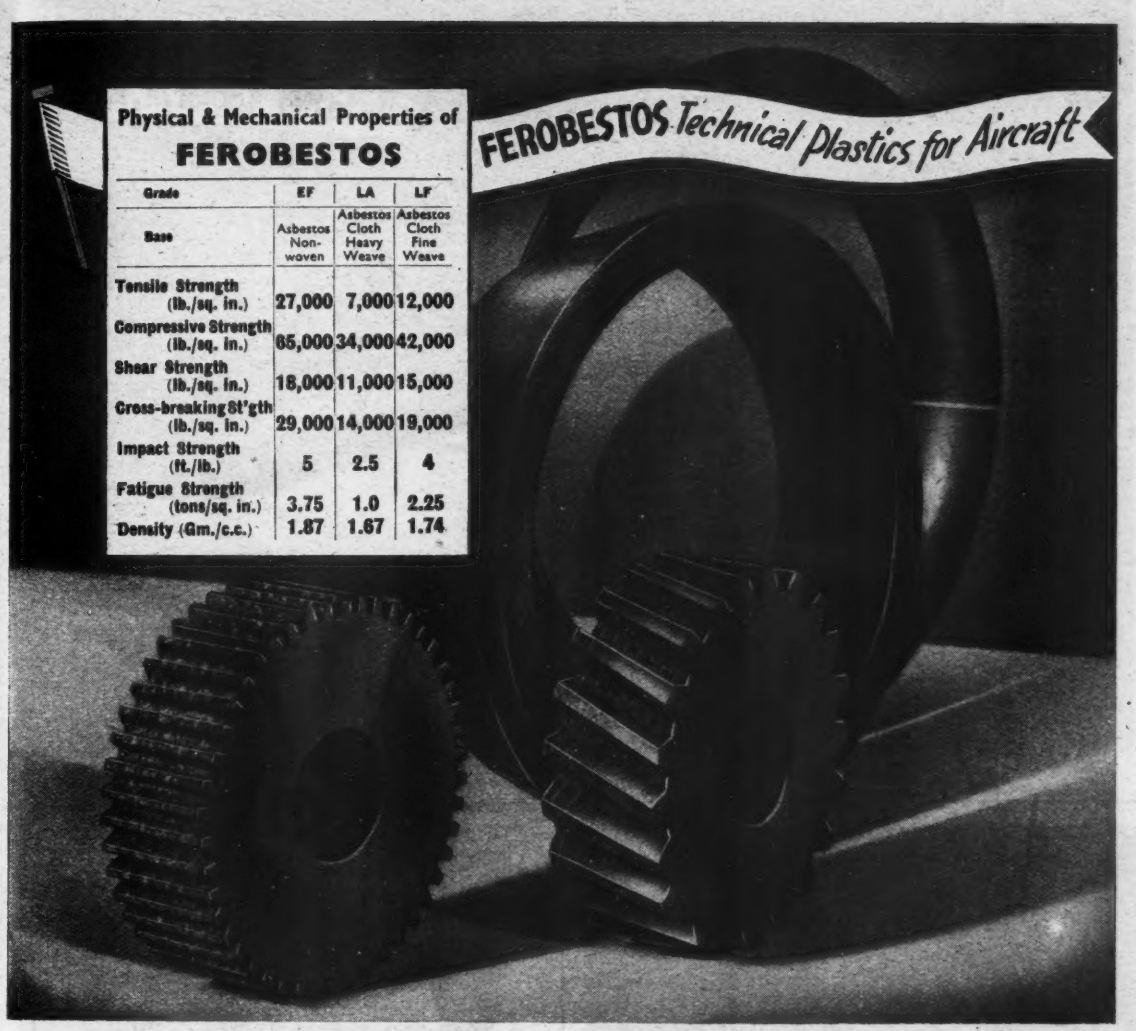
* Lectures by Air Comdre. F. Whittle.





"Flight" photographs.

Two hitherto unpublished views of the Fairey Prince (P24) engine. It is made up of two independent 12-cylinder units each driving its own airscrew. The Prince originally flew in a modified Fairey Battle. Bore 5.25in. Stroke 6in. Capacity 3,117 cu. in. Dry weight 2,180 lb. Power (normal) 1,550 h.p. at 2,600 r.p.m. (Maximum) 1,750 h.p. at 3,000 r.p.m. (Take-off) 1,800 h.p. at 3,100 r.p.m.



Physical & Mechanical Properties of FEROBESTOS

Grade	EF	LA	LF
Base	Asbestos Non-woven	Asbestos Cloth Heavy Weave	Asbestos Cloth Fine Weave
Tensile Strength (lb./sq. in.)	27,000	7,000	12,000
Compressive Strength (lb./sq. in.)	65,000	34,000	42,000
Shear Strength (lb./sq. in.)	18,000	11,000	15,000
Cross-breaking St'gth (lb./sq. in.)	29,000	14,000	19,000
Impact Strength (ft./lb.)	5	2.5	4
Fatigue Strength (tons/sq. in.)	3.75	1.0	2.25
Density (Gm./c.c.)	1.87	1.67	1.74

HEAT AND FLAME RESISTANT

All standard grades of FEROBESTOS Plastics can be used with safety up to 200° C (392° F). The thermal conductivity averages about 1.4 (x 10^{-3}) and the co-efficient of expansion 2.4 (x 10^{-5} per °C).

Special grades are available having higher heat resistance and which are also flame resistant up to 1,000° C for short periods.

FEROBESTOS

TECHNICAL PLASTICS

MADE BY FERODO LIMITED • CHAPEL-EN-LE-FRITH

TAYLORCRAFT AEROPLANES (ENG.) LTD., LEICESTER.

WHEN TIME IS MONEY...

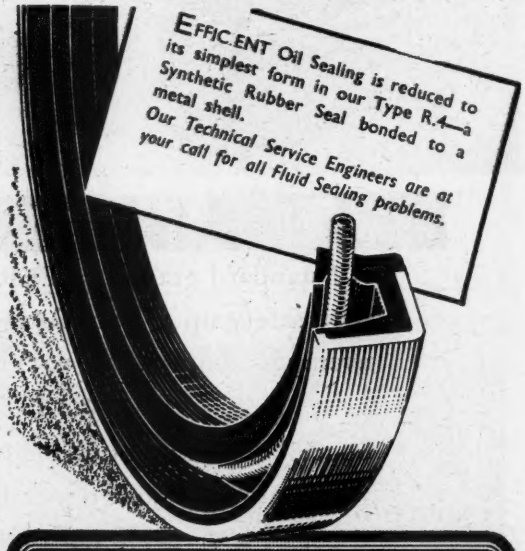
WE CAN HELP YOU SAVE BOTH
in the quick delivery of prototype castings

KENT ALLOYS LTD

LIGHT ALLOY CASTINGS · GRAVITY DIE CASTINGS
PRESSURE DIE CASTINGS
HEAVY NON-FERROUS ALLOYS
GUN METALS · BRONZES
ALUMINIUM BRONZES

HEAD OFFICE: ROCHESTER
Telephone: Strood 7676

Gilbert Sharp & Partners K.A.26


EFFICIENT Oil Sealing is reduced to its simplest form in our Type R.4—a Synthetic Rubber Seal bonded to a metal shell.
Our Technical Service Engineers are at your call for all Fluid Sealing problems.

WESTON
Oil Seals

CHARLES WESTON & CO. LTD · TORRINGTON AVENUE · COVENTRY
Telegrams: GITSEALS, COVENTRY Telephone: TILEHILL 66291-2 LONDON MANCHESTER GLASGOW

CIVIL AVIATION

No Subsidy for the Clubs

Implications of the Government Decision : Action or Extinction

AS might have been expected, the Government has decided that, "at this juncture," there shall be no subsidy for private flying. In spite of the undeniably good "second-line" work done during the war by club-trained pilots, the Air Council remain unconvinced of their possible value in any future emergency; the Treasury is unwilling to spend, without moral support, even the comparatively small sum involved; and the Minister of Civil Aviation probably cannot see any place for the club movement in the Government's nationalised scheme of things.

So there we are. In present austerity conditions I feel that no other decision could have been expected.

Unfortunately, the Government's offer, at a nominal price, of a hundred light aircraft for the clubs, turns out to be not so much a gift as a liability. In fact, 60 Tiger Moths, 30 Austers and 10 Magisters are available at £50 apiece, but these aircraft are apparently in very poor condition, and it is estimated that the cost of overhauling them for a C. of A. will work out at not much less than £400 each. So the total cost to the clubs will be in the region of £40,000—almost as much as might have been needed, in pre-war days, to buy the same number of suitable aircraft in new or near-new condition. Since the clubs handed over some 600 aircraft at the outbreak of war, the "gift" is a supremely feeble one, yet they are firmly told that no additional aircraft can be expected.

So far, 52 clubs have signified their desire to restart operations. Since each will, whether starting now or later, wish to retain its claim to at least one of the promised aircraft, the individual club fleets will consist of exactly 1.923 aircraft. Even at the highest flying costs it will not be possible for any club to operate successfully with two or, even at the most, three aircraft. Unless and until the few manufacturers of light aircraft are able or permitted to sell machines—and at a reasonable price—it will obviously be necessary to retrench.

Retrenchment

The number of operating clubs must be reduced to ten or so—either giving priority to those which have been active over the longest period, or to those which had the largest membership in 1939. Presumably most of the old-established clubs will be able to afford an initial outlay of about £4,000. Each will then need to behave with courage, making an accurate guess of the likely ratio between lowered hire costs and increased membership before taking a popular-flying plunge.

Obviously, the whole thing will be a waste of time and energy if the charges are going to be so high that only the privileged few can afford them. Not only will the resultant "rich man's pastime" appearance of club flying finally remove any hope of obtaining useful sympathy from the Government, but the clubs themselves will be virtually useless both as purveyors of general air education and as a potential market for (one hopes) an expanding civil aircraft industry.

It might be asked why the new Association of British Aero Clubs (which replaces the old General Council of Associated Light Aeroplane Clubs) cannot place a firm order with the industry for, say, a couple of hundred aircraft. The answer is that the order couldn't be accepted for immediate execution. Apart from the difficulties of arranging, and of obtaining necessary items for such production, light aircraft are being made, for the present, only on the understanding that a very high proportion of the output is for export. Since, with the American industry in competition, the numbers of aircraft exported cannot be very great, the production for home use is still more limited. The situation strikes one as being entirely similar to that in which a hungry dog might chase its own tail, but perhaps somebody understands the drift of the economic reasoning involved.

Certainly one can quite easily understand the political implications involved in any subsidisation or encouragement of a "luxury trade"—and that undoubtedly is how the club and private flying movement appears to the Government.

It is up to the Association to convince the Government, by practical example rather than by the arguments which have already been used without effect, that civil flying-training can not only pay its own way and bring flying within the financial reach of the normal person, but that this training can still be kept at a very high standard and have absolute uniformity of method. Only so can the Air Council be convinced of its merit.

Practical Proof

When enthusiasm and energy have shown results, and the growing popularity of the movement has been proved beyond doubt, then it is reasonable to hope that an austere Government may smile on it and offer the clubs something very much more ultimately useful than a mere subsidy—in fact, a profitable job of work to be done. The word "subsidy" stinks in the nostrils, and, at a Press conference last week, Mr. Whitney Straight, the chairman of the Association of British Aero Clubs, made it quite clear that he wanted only temporary assistance and this, preferably, in "payment by results" form.

We all know that the club-trained pilots did excellent work during the war; that the training standard of the clubs was, in general, extremely high; that Australia, for instance, has (see *Flight* of January 3rd, p. 21) gone ahead with subsidisation in a big way; and that, in fact, the Government's decision is a wrong one.

But the decision has been made and only the practical example of, and the popular support for, a vigorous, self-supporting club movement is likely to reverse it. If "there's gold in them thar hills"—and I believe there is—then let's go and get it. If there isn't, then the whole club business has so far been a spoon-fed weakling and we may just as well say good-bye to it in the interests of austerity.

H. A. T.

ENTRANCES AND EXITS

DESPITE the words "no step" on the flaps of the Messenger and Gemini, there is no reason to fear structural collapse if a pilot or passenger steps or falls on to the inboard sections. Our suggestion, in the description of the Gemini, that the flaps should be stiffened at that point has been anticipated—the flaps already have been stiffened.

NOW YOU KNOW!

THE following piece of news received recently from America is enlightening—or is it?

"The Civil Aeronautics Board to-day announced that it had determined to defer all further consideration regarding the approval or disapproval of the resolution of the International Air Transport Association providing for the regulation and conduct of traffic conferences which had been filed with the Board pursuant to section 412 of the Civil Aeronautics Act. The Board stated that certain imminent developments in the field of international air transportation caused it to conclude that the public interest of the United States required that any further consideration of a decision regarding the resolution establishing traffic conferences be postponed."

CIVIL AVIATION

Approved Air Routes

Services Proposed at Bermuda for the U.K. and U.S.A.

THE full terms of the Bermuda Agreements between this country and America have now been made known. Amongst the more detailed information disclosed is a complete list of the proposed routes over which the two countries may operate. This forms part of an annex to the bilateral agreement. As explained in last week's issue of *Flight*, some of these routes are already in operation, and others may not begin to operate for some while yet. However, their extent may be judged from the accompanying table, which sets out all seven of the routes to be served by U.K. airlines.

The annex to the agreement explains that, for the purpose of operating air services on these routes, the U.K. airline operator designated may be accorded the use of any airport, which is for international air services, at each of the places specified. The airline will also have the use of the airport's ancillary facilities, full rights of transit, of stops for non-traffic purposes, and of commercial entry and departure for international traffic in passengers, cargo and mail. Naturally all this is subject to compliance with the remainder of the annex and the agreements, which, it will be remembered, cover such points as the regulation of rates, the change-over from large to smaller aircraft at key points, the right to carry "fifth freedom" traffic, and the general principles agreed between the two delegations.

Choice of Routes

Aircraft can leave any of the departure points listed in the accompanying table, for any of the destinations shown in the third column of the table. On the way to that destination, the aircraft can make calls at any one or more of the intermediate stops mentioned in the second column. In addition, if it is desired, the aircraft can continue beyond its destination in U.S. territory to any of the points shown in the fourth column of the table. Changes of the route taken by one country's aircraft in the other country's territory will be made only after consultation and agreement between both countries.

Compared with the seven air routes proposed for the U.K., thirteen are shown for the United States. The same conditions apply to both countries, but the U.S. routes listed are on a more world-wide scale than ours. This is to be expected, for whereas our routes to Europe, to Africa and to the East do not touch American territory, American routes to these places obviously do touch British territory from time to time. Thus, the U.S. Route 1 leaves from a number of alternative starting points in America for London or Prestwick, and thence, for a variety of points in Europe; Route 2 is similar, but continues on across Turkey, Iraq and Iran, to India; Routes 3 and 4 run to Lydda in Palestine, continuing on through Iraq and the Persian Gulf to India and the Far East: and so on. Other routes cross the Atlantic to West Africa, North Africa and to South Africa, and also cross the Pacific to China, Burma, Singapore and India. In addition, there are the more local U.S. services to the West Indies and South America. All have stopping points in British territory.

So far as both countries are concerned, many of the proposed routes are far from settled in detail, and so provision is made for the aeronautical authority of one country to give notice to the other country of the final pattern of services on certain of the routes which are listed in the annex.

ROUTES TO BE SERVED BY U.K. AIRLINES
(In both directions; stops for non-traffic purposes omitted)

Departure point	Intermediate points	Destination in U.S. territory	Points beyond this destination
Route No. 1 London... ...		New York	San Francisco, Honolulu, Midway, Wake, Guam, Manila, Hongkong, Singapore.
Route No. 2 London, Prestwick	Shannon, Iceland, Azores, Bermuda, Gander, Montreal	New York, Chicago, Detroit, Philadelphia, Washington, Baltimore, Boston	
Route No. 3 London, Prestwick	Shannon, Iceland, Azores, Bermuda, Gander, Montreal	New York	(*a*) New Orleans and Mexico City. (*b*) Cuba, Jamaica, Panama, points in Colombia and Ecuador, Lima, Santiago.
Route No. 4 Bermuda ...		Baltimore, Washington, New York	Montreal.
Route No. 5 Trinidad, BritishGuiana, Jamaica, British Honduras	Tobago, Barbados, Grenada, St. Vincent, St. Lucia, Antigua, St. Kitts, St. Thomas, San Juan, Ciudad, Trujillo, Port au Prince, Jamaica, Cuba, Nassau, Bermuda	Miami	
Route No. 6 Nassau, Cat Cay		Miami, Palm Beach	
Route No. 7 Singapore, Hongkong	Manila, Guam, Wake, Midway, Honolulu	San Francisco	

PACIFIC AFFAIRS

PAN American Airways have arranged to reopen their San Francisco-New Zealand service. In addition, the company has intentions of opening a 30-hour trans-Pacific service between Sydney and San Francisco, running once a week to begin with, but later increasing to three services per week, using Lockheed Constellations. Apparently, however, no definite arrangement is possible until the Australian and U.S. Governments reach an agreement on reciprocal landing rights.

It is also reported that the Australian Government strongly favours the inauguration of three trans-Pacific flying boat services, two of them to be British, and wants to see these Pacific links set up before the Pan American route comes into operation. The resumption of the Australia to Britain flying-boat service is also favoured.

No doubt, these matters will all be discussed in Australia, between Mr. Arthur Drakeford, the Australian Air Minister, and Viscount Knollys, chairman of B.O.A.C. The latter left England last week, on a visit to Australia, and will also be calling at Singapore, Hongkong and Rangoon during his tour.

Meantime, Lord Winster, the Minister of Civil Aviation, left England on February 21st, for New Zealand, at the invitation of the New Zealand Government, in order to attend a civil aviation conference there. He was accompanied by the Deputy Director-General of Civil Aviation and by representatives of the Dominions Office and of the Ministry of Supply and Aircraft Production. Questions affecting the operation of air services in the South Pacific area will be discussed. Lord Winster will be joined, in Wellington, by Viscount Knollys. An Australian delegation led by Mr. Drakeford will attend the conference, and it is understood that the High Commissioner for Canada in New Zealand will also be present.

PAA

18 years of SERVICE *lies behind this symbol*

YOUR STEWARD on the Pan American Clippers, now flying between London and New York, has a long tradition of air service behind him.

Ever since 1929, Pan American World Airways has served complimentary meals to passengers while in flight... Years of *experience* lie behind every move your Clipper steward makes. We say "your steward" because, of course, you will be wanting to fly to New York by Clipper as soon as seats are available. Frequent schedules will make it easy. And besides the delicious meals included in the cost of your fare, Pan American offers many other special complimentary services.

For information, write or 'phone your Travel Agent—or United States Lines, General Agents for Pan American World Airways, 17 Pall Mall, S.W.1. WHItehall 4162.

"Go by *Clipper* when you go."

PAN AMERICAN WORLD AIRWAYS

The System of the Flying Clippers

IN A SMALLER WORLD

To-day no place on earth is far removed from another. The speed and span of communications is drawing together the boundaries of our world. The pioneer work of Marconis has played a leading part in this process. It will continue to do so in the years ahead. In every part of the world Marconi technicians will be blazing new trails of achievement. On land, on sea, under the oceans and in the air, Marconi equipment will be carrying on the intensified activity of a "smaller world."

MARCONI WILL STILL LEAD THE WAY

MARCONI'S WIRELESS TELEGRAPH COMPANY LTD
THE MARCONI INTERNATIONAL MARINE COMMUNICATION COMPANY LTD
ELECTRA HOUSE, VICTORIA EMBANKMENT, LONDON, W.C.2

CIVIL AVIATION

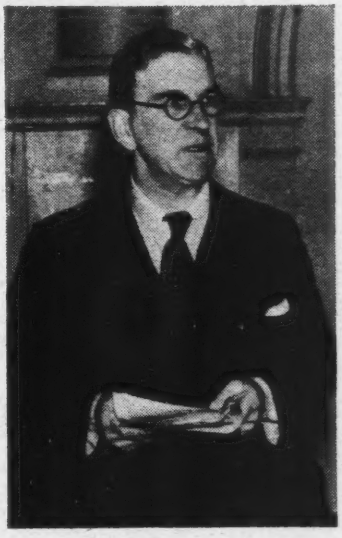
Informal Radar Conference

Applying Wartime Navigational Aids to Civil Aviation : European Delegates at London Discussions

REPRESENTATIVES from most European countries met in the conference room at the Ministry of Civil Aviation last Monday in order to begin a fortnight of discussion on radio and radar navigational aids and their application to international civil aviation. The latest types of radar equipment, which have been on the "top secret" list throughout the war, were on view, and technical lectures and films demonstrated to the delegates the secrets of our wartime navigational developments.

The object of the conference, as Sir Robert Watson-Watt, who is Scientific Advisor on Telecommunications to the Air Ministry, later explained, was primarily to afford those European countries which were less favourably placed than ourselves during the war an opportunity to bring their knowledge of radio and radar up to date. Arrangements were made for delegates to see, in operation, the various types of radio and radar navigational aids which are now available, and to gain experience of their value under flying conditions. Subsequently there have been full opportunities, during this second week of the conference, for the delegates to compare notes on the equipment which they have seen demonstrated.

It is hoped that these informal discussions between the delegates, and the opportunity to compare the latest radar aids with the navigational needs of the countries which they represent, will do much to ensure co-operation between European countries on this matter, which is of such great importance to civil aviation generally. It will also help them to prepare for formal conferences such as those convened at the request of P.I.C.A.O. in Dublin next week, and in Paris shortly, at which efforts will be made to standardise international flying practices and navigational procedure.



Lord Winster welcomes the European delegates.

The countries which accepted invitations to attend the conference were Belgium, Czechoslovakia, Denmark, Egypt, Eire, Finland, France, Greece, Hungary, Iraq, Italy, Netherlands, Norway, Rumania, Spain, Sweden, Switzerland, Turkey, U.S.S.R., and Yugoslavia. However, a few of the delegates were unable, owing to adverse weather, to reach London in time for the first three or four days of the conference. In addition to the acceptances, three countries sent observers, namely, Canada, Newfoundland and the United States. Only two countries declined the invitation. They were Poland and Portugal, and their declination was on the grounds that they had no suitable available delegate.

Comprehensive Programme

The first two days of the conference were occupied by papers given by the Ministry of Supply and Aircraft Production on Gee, Loran, Rebecca, Babs, the Consol and the Decca navigation systems, A.C.R., and Communications for Civil Aviation. There was also a paper by the Ministry of Civil Aviation on "Special Problems of Airfield Control." The papers were well illustrated by films and slides. The remainder of last week was spent by the delegates at R.A.F. station Bassingbourn, where various aids were demonstrated in actual flying conditions by R.A.F. Transport Command aircraft.

Opening remarks were addressed to the conference by Sir William Hildred, the Director-General of Civil Aviation, who pointed out that the purpose of radar technique was to give a degree of regularity to civil aviation which we certainly had not yet achieved.

The conference was officially opened by Lord Winster, who welcomed the delegates. He said that civil aviation had a very important part to play in overcoming the wartime destruction of communication systems, particularly in Europe. However, an obstacle in many parts of Europe was the lack of adequate ground services. Great advances had been made in radio and radar development during the war, and it was now possible to withdraw the veil of secrecy and to disclose an "embarrassment of riches" in the modern radio field which made it very difficult to select the developments which were most suited to the needs of civil aviation. Lord Winster pointed out that the international talks during this conference were only of an exploratory nature, and were to be regarded as informal, but he hoped that they would go far towards the provision of a framework for European regional standardisation, and would thus be the forerunner of the later international talks under the auspices of P.I.C.A.O.

Sir William Hildred (left) and Sir Robert Watson-Watt were the other two speakers at the opening meeting of the conference.

CIVIL AVIATION NEWS

P.I.C.A.O.'s FUNDS

WHEN he submitted the financial report of P.I.C.A.O. as at December 31st last year to the Interim Council, Dr. Albert Roper, the Secretary-General, disclosed that, to date, thirteen States have advanced funds to the organisation. They are Australia, Belgium, Canada, China, Egypt, France, Iceland, Iraq, Liberia, Norway, Switzerland, United Kingdom and the United States. Many of the countries have already paid in full, including the U.K. and the U.S.A., each of which has contributed 119,160 dollars.

ANGLO-FRENCH AGREEMENT

NEGOTIATIONS with the French Government for an agreement on air services between France and her territories and the United Kingdom were opened by a British delegation which arrived in Paris on February 18. The delegation was led by Mr. Ivor Thomas, Parliamentary Secretary to the Ministry of Civil Aviation, and included Major J. R. McCrindle, Mr. J. Brancker and Mr. W. W. Burkett, also of the Ministry of Civil Aviation, Mr. R. Gallop, of the Foreign Office, and Mr. R. Vile, of the Colonial Office. The negotiations were concluded within the week, and, last Saturday, a civil aviation agreement was initialled by representatives of both countries. Details will be made known later.

"V. I. BUSINESS P.s"

TWENTY-FIVE per cent. of air and surface passenger accommodation, allocated by the U.S. War Department for civilian use, is to be reserved for American businessmen. This arrangement has been made with the Departments of State and War by the U.S. Department of Commerce, and will apply to American businessmen who wish to use Government-controlled aircraft from Europe, or to or from India, Africa, the Middle East, or the Far East.

The purpose of the scheme, as announced by the U.S. Under-Secretary of Commerce, is to "give travel preference to businessmen whose travel will be the most effective in expanding exports and imports, in increasing employment in the United States, in speeding shipments of scarce materials and merchandise and in assisting American concerns to arrange contracts with foreign nationals who will act as their representatives abroad."

ITEMS FROM THE AIRLINES

K.L.M. has begun a tri-weekly service between Amsterdam, Madrid and Lisbon.

* * *

The oldest service operated by K.L.M.—that between Holland and London, which first began in May, 1920, is to reopen on March 4th. Their service to Paris will recommence at the same time.

* * *

Trans-Canada Airlines have announced that their service to the U.K. is now available to normal fare-paying passengers. In the past, this service has been confined to priority ticket holders. The new arrangement does *not*, however, apply to the westbound route, for which British priorities are still necessary.

* * *

A non-stop flight from New York was made recently by a Pan American Airways' Constellation, which arrived at Hurn on February 11th. The aircraft made the journey in 12 hr. 15 min., and was the first commercial aircraft to complete a non-stop flight from New York to England.

* * *

Iberia, the Spanish airline company, is planning to run a service to London to supplement the existing B.O.A.C. service. Ultimately, it is hoped to establish a daily service between London and Madrid, instead of the existing twice-weekly arrangement. The Trans-World Airways Corporation, in conjunction with Iberia, may start a new service between Madrid and New York at the beginning of March.

* * *

Early this year Tata Air Lines replaced their Beech Expeditor twins with converted Dakotas on the Karachi-Hyderabad-Colombo and Bombay-Delhi routes. A daily service on the Bombay-Calcutta route should be started early next month.

Indian National Airways have, following negotiations with the Indian Government, started their Lucknow-Rampur-Delhi service. This is being operated daily each way with D.H. Dominies.

BUSY AIRLINE

WHEN Scottish Aviation celebrated its tenth anniversary dinner on February 15th at Prestwick Airport, Mr. D. F. McIntyre said that the new Prestwick-Belfast air services had carried just over 1,000 passengers in seventeen days' operation. He promised that the present fare of 30s. per single journey, which was primarily necessitated by petrol limitations, would be reduced step by step until he could offer fares comparable with those offered to the American public by American internal operators.

NAVIGATIONAL TRAINING

AFTER six years of aircraft modification work and other special wartime commitments, Air Service Training, of Hamble, are hoping soon to return to the work for which the concern was originally formed—that of civil aircrew training. By way of a start, and because of the urgent need for it, they will first concentrate on ground instruction.

It is known that, very shortly, new standards will be required of "B" licensed and air transport pilots in the matter of navigation knowledge, and examinations to these new standards will be held with effect from April 1st. It would also appear that, on and after October 1st, these new standards will be obligatory, and a considerable number of pilots will need to be re-examinated if they are to retain their present jobs.

In addition, holders of R.A.F. 1st or 2nd Class Navigators' Warrants will need to be "converted" and, as the civil requirements are based on training which differs in many ways from that which obtains in the R.A.F. to-day, those who desire to be converted from warrant-holding to licence-holding will need more training.

With the object of helping those interested, A.S.T. propose to start, on April 1st, courses of navigation instruction to meet the following requirements:—(a) Training for Navigators' 2nd Class Licence, or Airline Transport Pilots' Licence (5 months); (b) Conversion of holders of 1st Class R.A.F. Navigator Warrants to 1st Class Navigators' Licence standard (4 months); (c) Conversion of 2nd Class R.A.F. Warrant holders to 2nd Class Navigators' Licence standard (3 months); (d) Conversion of 2nd Class R.A.F. Navigators' Warrant holders of 1st Class Navigators' Licence standard (6 months).

IN THE HOUSE

Twenty Tudor I aircraft will be delivered during 1946, two of them in the first quarter of the year, six in the second, ten in the third and two in the fourth, provided that no serious technical difficulties are experienced. These figures were given by Mr. Wilmot, Minister of Supply and Aircraft Production, in a reply to a question in the House of Commons.

* * *

When asked by Wing Cdr. G. Cooper what state of progress the Short Shetland flying boat had reached at the time of its destruction, Mr. Wilmot informed him that the Shetland had been completed as a military aircraft, and was undergoing official trials at the time of its loss. The trials were well advanced and the aircraft was almost ready to be returned to its makers for conversion. One other prototype was under construction. The production of the Shetland for use on the Atlantic and Empire air routes was under consideration by the Ministry of Civil Aviation.

* * *

Replying to a question from Air Cmdre. Harvey, Mr. Wilmot said that 150 Continental engines had been ordered from the U.S.A. for use in light civil aircraft. At least 90 per cent. of these aircraft when built would be exported from the country. The Minister added that it was better to import the engines rather than lose the export order.

* * *

In a written answer, the Parliamentary Secretary to the Ministry of Civil Aviation recently stated that the Ministry was considering the question of establishing a flying-boat base in Scotland as a part of the overall study of the future development and use of the flying boat.

* * *

Another answer by Mr. Ivor Thomas stated that the London Air Priorities Board had decided to discontinue the priorities system on internal civil airlines. In spite of this, the operating companies had agreed to make accommodation available for businessmen travelling between this country and Belfast, should a properly sponsored case of great urgency arise.

Nice way to miss an appointment...

He went by air for convenience. But he didn't bargain for a parachute landing miles from anywhere.

They say lots of business men are going to use the air for their business journeys. So they will, of course. But how soon and how often they use air transport will depend on how certain and regular it is. And that depends to a very great extent on that unexciting necessity—Ground Service. If you are going to operate planes or sell planes you might care to hear about our plans for providing comprehensive Ground Service.

FIELD AIRCRAFT SERVICE

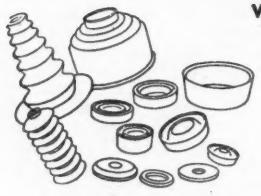
A Company of the Hunting Group

FIELD CONSOLIDATED AIRCRAFT SERVICES LIMITED, GREAT WOODCOTE HOUSE, WOODCOTE DRIVE, PURLEY, SURREY.
TELEPHONE: WALLINGTON 7001. TELEGRAMS: FIELDAIR, PURLEY.

C.S.C.9.

We can guarantee to increase the efficiency of your plant . . .

Sealing is our business and to most we are known for the Superfect Oil Seal on rotary shafts; but our field extends far beyond this range in that we are equipped with the most modern plant for dealing with all types of mouldings and extrusions, compounded and specially designed to the engineer's specifications. We guarantee high-class finish and fine limits. If your problem is static, oscillatory, rotary or reciprocating, with your co-operation this can undoubtedly be solved.



SUPER OIL SEALS & GASKETS LTD

BIRMINGHAM FACTORY CENTRE • KINGS NORTON • BIRMINGHAM

TELEPHONE: KINGS NORTON 2041 TELEGRAMS: OILSEAL • BIRMINGHAM

SUPERFECT

FOR JOINTINGS PACKINGS MOULDINGS ETC.

KAUTEX

CORK & SYNTHETIC RUBBER MATERIALS

We are specialists in the production of Appliances and Materials for the conservation of Rubber and Plastic Products. Enquiries are invited.

KAUTEX Materials for Jointings, Packings, Mouldings, etc., are used on Aircraft, Motor Vehicles and Ships, and in Electrical and other Power Installations, as well as a hundred-and-one other situations calling for specialised materials that are light, strong, resilient, tough and durable according to present-day scientific standards.

Supplied in sheets, gaskets and mouldings.

Write for samples and particulars.

KAUTEX (PLASTICS) LTD., *Dept. F,* **ELSTREE WAY, ELSTREE, HERTS.**

TELEPHONE: ELSTREE 1777-8.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

IN SEARCH OF SAFETY

Preserving Evidence of Sea Crashes

CIVIL aviation in this country has achieved a remarkably good accident-free record. But it is not with this side of the story that I am concerned.

It is an unarguable fact that when an aircraft crashes there is a definite reason, and it is up to the authorities concerned to ascertain the cause. It is with regard to establishing the true facts of all crashes that I am concerned.

In civil aviation neither the crew nor the passengers are provided with parachutes, nor any other means of reaching safety in the event of an impending crash. It is true that some of the latest types of larger civil aircraft now carry dinghies, but still no parachutes. The dinghies certainly provide for escape in the event of the aircraft landing on the water and remaining afloat for a short period. But if the aircraft should dive into the sea then the dinghies are of no use.

In such cases what can be the ultimate result of any enquiry? Your guess is as good as mine. But what makes the position worse is that there is not even the slightest piece of evidence or tiniest piece of aircraft available for examination. Such a state of affairs must always be regarded as unsatisfactory, particularly from a technical view point.

In the large type of civil aircraft of the future the aircrew carried number five or more persons. Would it not be practical to carry a few fighter-pilot type parachute and dinghy packs so that, in the event of the aircraft getting out of control, certain members of the crew will be ordered to bale out. This will at least provide a chance for some of the members of the crew to reach safety and give first-hand evidence of the trouble experienced. This evidence could not be obtained from any other source, and may be of such a vital nature as to affect the safety of other aircraft in operation.

It cannot be argued that the few extra pounds weight involved in carrying these packs is an excuse for not having them. If there is the slightest possibility of making flying safer, even at the expense of a few extra pounds weight, then surely that is the course to follow.

Now that long and regular sea trips are flown daily, it is up to the operators to ensure that, in the event of an accident, all possible precautions have been taken to ensure that the future and safety of the passengers, and air transport generally are safeguarded to the maximum.

E. G. SMART.

HIGH-ALTITUDE PROBLEMS

Britain Must Give Them More Attention

LISTENING to lectures given before learned societies and reading articles on the subject has led me to believe that high-altitude flying presents many problems of which few people are really aware and of which full practical knowledge is essential if this country is to make use of its one recognised superiority in the aircraft world, namely, the turbine/jet engine.

Presumably it is agreed that we want to fly high, and what is more important, that we must fly high to achieve the combination of speed and economy required of a jet engine if it is to be used for air transport. It must also be agreed that one of the few justifications for a rather noisy, expensive and comparatively uncomfortable method of travel is the saving in time due to high speeds.

Supposing then that we are able, as I think, to adapt an existing aircraft or produce a suitable new one in a fairly short time, and using even the jet units already available, what is to prevent our going ahead and inaugurating high-speed airlines on Empire and especially Atlantic routes? As I see it, the answer is that we have failed so far to give sufficient attention to air-conditioning and all it entails at, say, 40,000ft.—the lowest altitude suitable for operation of the sort of aircraft in mind.

Have we heard yet of an engine which, among its auxiliary drives, has provision for pressurisation of a cabin? For thirty passengers flying at 40,000ft., some 100 h.p. is likely to be needed to build up the air pressure, and with a conventional I.C. engine this would be nearer 500 h.p. at sea level. Do we hear designers of airliners anxiously discussing refrigeration? Dr. Hooker in a recent lecture mentions air delivery temperatures of over 100 deg. C. due to the temperature rise occasioned by raising the air pressure from that of the outside atmosphere at altitude to somewhere near normal. Are all the passengers to have sore throats after the first hour's flying, or have we developed humidifiers to put moisture into the intake of upper air? I could name one country that is working hard on these problems!

We were the first nation to fly the Atlantic; we shall not be the first to operate a post-war transatlantic airline. We could be the first to put a really fast and advanced service into operation and so pull in a little much-needed prestige in the airline world.

ARMSTRONG JACKSON.

LONG-DISTANCE RECORD

Fuel Overload Problem

WITH reference to Mr. J. L. Coverdale's letter in *Flight*, February 7th, I am rather worried over his figures for the Lancaster's range performance. Assuming that the 4,900 gal. of fuel he quotes could be accommodated in an overload system, the all-up weight of 73,000 lb. would be a bit of a problem. The "10-tonner" Lancasters could probably supply the solution to that problem, but, having become airborne, I cannot see how Mr. Coverdale's aircraft could possibly achieve a consumption of only 29 gal./hr./engine—even on a trip of 42 hr. duration.

With the take-off weight at 73,000 lb. and cruising at 190 m.p.h. the average fuel consumption, even over the 42 hr. trip, would be at least 35 gal./hr./engine.

I wonder if a "Wimpey type" can detect a similar optimism in the figures given for the Wellington.

R. G. LOFTING.

Single v. Four-engined Range

I READ with interest W/O. Leonard W. F. Brock's letter published in *Flight*, February 14th, concerning the range qualities of the Avro Lincoln. From the recent release of "gen" about the Lincoln I have calculated its maximum range on an a.u.w. of 97,350 lb. (normal a.u.w. 82,000 lb.).

AVRO LINCOLN MK. I.
(Four 1,635 h.p. R.R. Merlin 85s.)

Weight empty	37,700 lb.	Wing loading ..	67.8 lb./sq. ft.
Radar, radio, etc. ..	3,100 lb.	Power load	14.6 lb./h.p.
Extra fuel tanks carried in bomb bay	2,000 lb.	Fuel consumption per engine at 40 per cent. power	41 gal./hr.
Tare weight	42,800 lb.	Duration	44½ hr.
Crew 6	1,200 lb.	Maximum range cruising at an average speed of 200 m.p.h...	8,900 miles
Oil, 200 gal.	1,800 lb.		
Total fuel, wings and bomb bay (7,160 gal.)	51,550 lb.		
A.u.w.	97,350 lb.		

From the limited amount of information about the record-breaking Boeing B29 Superfort I have estimated the weights and loadings given below.

BOEING B29 SUPERFORTRESS.
(Four 2,200 h.p. Wright Cyclone R3350s.)

Weight empty	62,000 lb.	Wing loading	80.18 lb./sq. ft.
Radar, radio, etc. ..	3,500 lb.	Power load ..	16.0 lb./h.p.
Weight of extra fuel tanks	4,250 lb.	Average (total) fuel consumption ..	260 gal./hr.
Tare weight	69,750 lb.	Range	8,200 miles
Crew 12	2,400 lb.	Duration	35 hr.
Oil, 270 gal.	2,450 lb.	Average cruising speed ..	234 m.p.h.
Total fuel, 9,220 gal. (Imperial)	66,400 lb.		
	141,000 lb.		

I consider that the Wellington Mk. I is the ideal aircraft to be used in an attempt on the world's long-distance record. In my last letter published in *Flight*, February 7th, I gave some data on the Wellington Mk. I overloaded to 39,700 lb. When flying at this weight the Wellington is capable of ranges up to 10,000 miles.

With regard to D. E. Potter's letter (*Flight*, February 14th) on the question of the superior range of multi-engined aircraft

CORRESPONDENCE

as compared with single-engined types, may I point out that although a four-engined aircraft can certainly carry a larger proportion of fuel than a smaller type, the fuel-consumption of the four-engined aircraft is four times greater or more.

JOHN LAWSON COVERDALE.

R.A.F. SLANG

A Few More Probable Derivations

MAY I submit a rather belated reply to the letter on "The First Strip," by Mr. W. H. Brown (*Flight*, Jan. 17th)? I would like to suggest the following derivations and comments:—

Torn off a strip.—Meaning reprimanded, told off, given the raspberry. Enquiries into its origin prove futile, but it must be admitted that there is a considerable coincidence in the fact that the noise produced by tearing off a strip of cloth is not unlike the colloquial "raspberry."

Gen.—Reliable information. Some say it is an abbreviation of "genuine information," but at one time official documents were headed "For the General Information of All Concerned"; the latter would seem to be the more probable. The use of the word has spread into "civvy street" in no mean manner.

Bind.—A depressing job or situation, one who is a bore. It is one of the oldest expressions in the R.A.F., and the origin is in an aircraft's brakes binding when they should not—itself a bind.

Clueless.—Ignorant. This should be self explanatory; without a clue, without an inkling. A Clueless Type is the opposite of a Gen Wallah.

Mr. Brown might also be interested in some other expressions, possibly covered by his ". . . and so forth:"

It's a piece of cake.—It's easy, it's a cinch. Literally, it's easy to get your teeth into, and is a modern version of a Great War saying, "There's jam on it," or "It's Jammy."

Panic or flap.—An excitement caused by any duty. It is derived from an old naval expression referring to the high-speed preparations before going to sea.

Then the very R.A.F., very effective *You've Had It*, (you cannot have it, you have missed it), has been the subject of an article in *The Times*. Surely it originated in station stores? . . . It's no use asking for more . . . You've Had It!

IAN LEE-DUNCAN.

Not a Wartime Innovation

THERE have been a number of letters in your columns regarding the origin of such phrases as "tearing off a strip," and I notice that many explanations—or rather guesses—have been offered as to the way in which such phrases became common parlance. These guesses seem to limit the use of such slang to the period of the recent war. In fact, however, much of this slang was quite common long before the war, and I would suggest that the only reason for its sudden prominence is the tremendous expansion of the R.A.F. and the publicity given to its efforts during the past six years. After all, which of us hasn't at least one "R.A.F. type" in the family?

Although I had little to do with the R.A.F. before September, 1939, the phrases "tearing off a strip" and "couldn't care less" and such terms as "wizard" and "bang-on" were hardly unfamiliar ones ten years ago.

EX-V.R.

[A point nobody has yet raised is how much of this slang is actually common to all three Services and not exclusive to the R.A.F.—ED.]

FOR THE BOOKSHELF

First Tide, by Alan Melville. Skeffington and Son, Ltd., 12s. 6d. net.

ALAN MELVILLE was a B.B.C. War Correspondent in R.A.F. uniform. He landed in Normandy on D-Day, and he describes the whole campaign up to the halt at the Scheldt while the way into Antwerp was being cleared. Though he was no authority on things aeronautical, he gives very vividly a picture of what air cover meant to the soldiers on the ground. His powers of descriptive writing are great, and he uses them all to describe the bombardment when the heavy machines of Bomber Command tackled the defences of Caen. It is a grim story. Not less so is the description of the havoc wrought by our aircraft on the lanes leading out of the Falaise Gap.

The majority of the book is not of air interest, but it is full of the interest attaching to the first steps of the victorious invasion of Europe. It has one very good map. F. A. R.

"Hurricane," by F. H. M. Lloyd, 7s. 6d. The Harborough Publishing Co.

THERE is something original in the idea of writing a biography about a piece of machinery, with the more normal human subject of such a book merely as incidentals. To some degree this has been done before in the world of films when the *First of a Few*—a not very accurate story of the development of the Spitfire—appeared; but in that case, to all but the more technically interested film-goers, the actual aircraft took a very second place.

Hurricane has been published with the co-operation of Hawkers and by a member of the firm's technical staff, so there should be no question about its accuracy, and it is, one feels, more than high time that this fighter should be given its full praise for work throughout the war and, in particular, during the Battle of Britain. The average member of the public undoubtedly considers that the Spitfire won the battle; certainly this aircraft played a critical part, but the Hurricane was very much in the majority as a type and was, in consequence, responsible for 61 per cent. of the total German losses.

The Hurricane was in front-line use in the Far East until the very end, yet the basic design was conceived as long ago as 1933 in the form of a monoplane version of the Fury biplane fighter. One way or another the design inevitably developed along more and more individual lines, and the prototype was, superficially, very similar to the last production aircraft, which was flown in September, 1944.

Mr. Lloyd mentions, in his final chapter, a number of experiments or prospective experiments about which little or nothing was heard at the time. In addition to the "Hurri-biplane" with the jettisonable upper wing, there were the "Hurri-glider," suggested for long-range convoy protection, the "Hurri-Liberator" composite, and many others.

"Red Rain. By Leslie Kark. 8s. 6d. Macmillan and Co., Ltd.

THIS is not merely a good novel about flying; it is a very good novel in its own right. We have learnt to make allowances for a certain literary amateurishness in books by flying people so long as their pictures are technically true.

In this case no allowances are needed. *Red Rain* is thoroughly professional and describes real persons, with real thoughts and against a real background—so much so that certain passages and character drawings produce a form of nostalgia in the reader. The picture of the brother and sister relationship, for instance, of Judith and David Tetlow is perfect, and the impossible situation between Robert and Dilys is handled with understanding. There is no false sentiment or tendency to try to give the reader some sort of happy ending when, by the very rules of the real world, no such ending is decently possible. It is a grown-up novel.

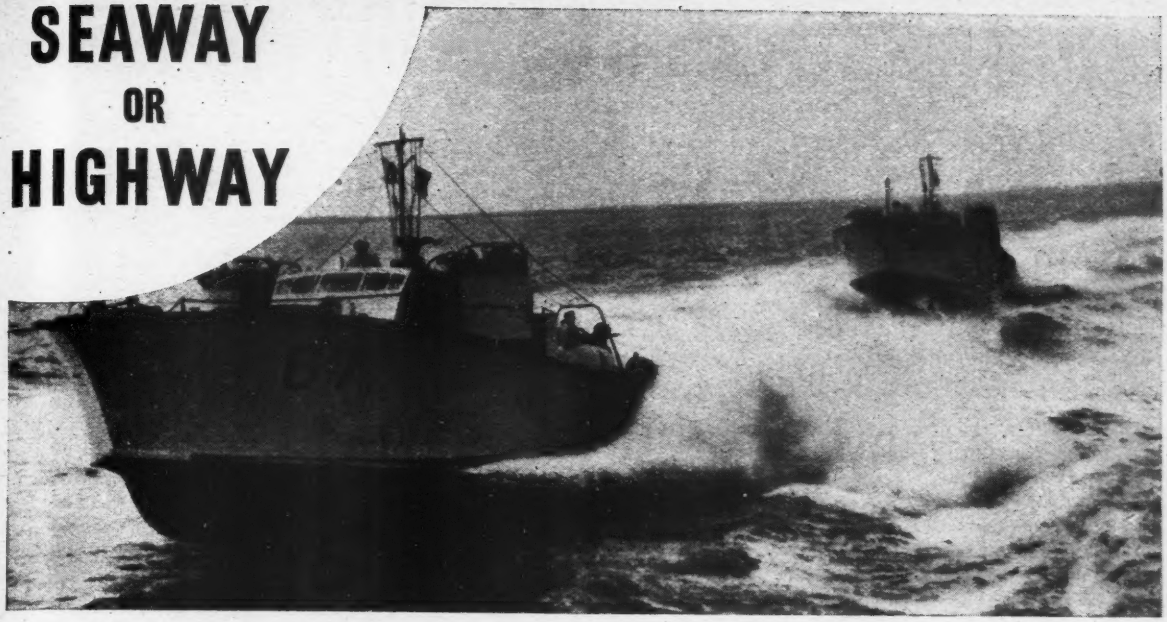
If criticism can be applied it concerns the fact that Wing Cmr. Kark has attempted too much and has given the reader such a complete picture of each member of the crew of the bomber which is eventually lost over Munich that it is difficult to maintain interest in any single one. The story would, perhaps, have been more satisfying if the drawing of one character—Michael, for instance—had been permitted to overshadow that of the others.

Wing Cdr. Kark is a man of understanding and sensibility. Listen to this: "It was a period in the war when false optimism and a kind of weariness with the promises of a second front and of the ultimate defeat of Germany and Japan somehow intermingled into a frustration and a despondency . . ." How well we all remember that phase. And he is blessed with a sound sense of the ridiculous. Here is an American flight engineer talking about gongs: ". . . We just have different values about medals . . . everyone who matters knows the difference . . . for the rest, it works to the Yanks' disadvantage . . . if *you* get a medal for singing in the choir at the time of the Coronation, people who don't know think, 'Uh-huh, Burma Campaign or something.' But, with us, if a guy wears the Congressional Medal of Honour, or something terrific like that, people say to themselves, 'Ah well, twenty-one to-day, I suppose, but he looks older . . .'"

H. A. T.

FLIGHT, Feb. 28th, 1946. Advert. 27

SEAWAY OR HIGHWAY



Plunging through the lanes of ocean, patrolling the narrow seas, or crashing down the bomb-pocked roads of Europe, our mobile weapons of war have worn a battle-dress of Cellon Protective Finishes. Cellon Finishes have endured the rigours of arctic snows, tropical sun and sands, and have stood up to the crash and clang of incessant battle duty. Never before have synthetic finishes faced or surmounted so cruel and prolonged test. 'Dukws,' Trucks, Launches, Minesweepers, Torpedo Boats, Amphibious Vehicles, Airborne Lifeboats—almost every type of vessel and vehicle has worn Cellon Protective Finishes to the wars. They provide as tough and durable a protective finish as science has yet evolved or industry produced. There is a Cellon finish for *your* job.

FULL DETAILS OF FINISHES FOR ANY SPECIFIC PURPOSE FROM CELLON LTD., KINGSTON-ON-THAMES. TELEPHONE: KINGSTON 1234 (5 LINES)

Thorp-Hambrock Co. Ltd., Montreal, Canada. Cellon Corporation Pty. Ltd., Sydney, Australia

CVS-546

ENGINE COWLINGS *by* CORNERCROFT

Bristol Buckmaster.
"Flight" Photo.

Cornercroft engine cowlings have been manufactured in thousands for all classes of aircraft, and we now have in hand orders for cowlings for post-war advanced type aircraft — reciprocating, radial and jet-propelled engines.

The Bristol CENTAURUS is one of the many modern aero engines cowled by Cornercroft.

CORNERCROFT LTD.

Coventry and Ashton-under-Lyne

GENERAL SHEET METAL WORKERS AND METAL SPINNERS TO THE AERONAUTICAL AND GENERAL ENGINEERING INDUSTRIES.

CC.9

Air-Sea Rescue Equipment for COMPLETE SAFETY

RUBBERISED FABRIC DEVELOPMENTS *BY* R·F·D COMPANY LTD

PNEUMATIC EQUIPMENT DESIGNED AND MADE TO SPECIAL REQUIREMENTS

AIRCRAFT DINGHIES AND FLOTATION GEAR WITH MANUAL, OR IMMERSION SWITCH OPERATING HEADS FOR AUTOMATIC INFLATION

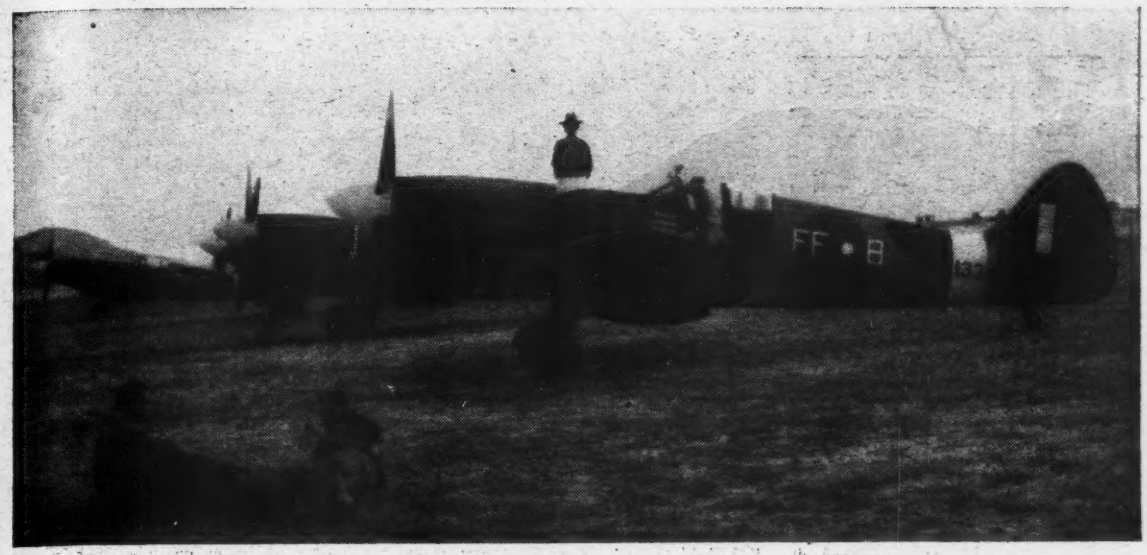
AIR BORNE LIFE-BOATS, CANOES, FLOTATION BAGS, CO_2 INFLATION GEAR, LIFE-BELTS, BALLOONS AIRCRAFT FABRICS

AIRCRAFT LIFTING BAGS, CANVAS HANGERS, TOW TARGETS, PARACHUTES, SAFETY HARNESS, PONTOONS, FABRIC FITTINGS

IF INFLATABLE, *consult* **R·F·D CO. LTD**

PIONEERS AND ORIGINAL INVENTORS

GODALMING, SURREY. *Telephone 1444*



PIRACY PATROLS: Spitfire XIVs of the Bombay Squadron, stationed at Hong Kong. The Squadron maintains constant patrols over the Hong Kong-Canton coastline in order to protect Chinese junks against pirates, who have been active lately.

SERVICE AVIATION

Royal Air Force and Naval Air Arm News and Announcements

17th George Cross for Royal Air Force

THE award of the George Cross to Acting Wing Commander Forest Frederick Edward Yeo-Thomas, M.C., Royal Air Force Volunteer Reserve, was announced in the *London Gazette* on February 15th.

This officer was parachuted into France on February 25th, 1943. He showed great courage and initiative during his mission, and was brought back safely to England on April 15th.

On September 17th, 1943, Wing Commander Yeo-Thomas undertook a second mission, but soon after his arrival in France many patriots were arrested. Undeterred, he continued his enquiries and obtained information which enabled the desperate situation to be rectified. On six occasions he narrowly escaped arrest. He returned to England on November 15th, 1943, bringing British intelligence archives which he had secured from a house which was being watched by the Gestapo.

This officer was again parachuted into France in February, 1944. In spite of every security precaution, he was betrayed to the Gestapo in Paris on March 21st. While being taken by car to their headquarters, he was badly "beaten up." He then underwent four days' continuous interrogation, interspersed with beatings and torture, including immersions, head downwards, in ice-cold water, with legs and arms chained. Interrogations later continued for two months, and Wing Commander Yeo-Thomas was offered his freedom in return for information concerning the Head of a Resistance Secretariat. Owing to his wrist having been cut by chains, he contracted blood-poisoning and nearly lost his left arm. He made two daring but unsuccessful attempts to escape. He was then confined, in solitude, in Fresnes prison for four months, including three weeks in a darkened cell with very little food. Throughout these months of almost continuous torture, he steadfastly refused to disclose any information.

Wing Cdr. F. F. E. Yeo-Thomas, who has been awarded the George Cross.

On July 17th, Wing Commander Yeo-Thomas was sent with a party to Compiegne prison, from which he twice attempted to escape. Together with 36 other prisoners, he was then transferred to Buchenwald. On the way, there was a three-day stop at Saarbrucken, where the prisoners were beaten and kept in a tiny hut. They arrived at Buchenwald on August 16th, and sixteen of them were executed and cremated on September 10th. Wing Commander Yeo-Thomas had already commenced to organise resistance within the camp and remained undaunted by the prospect of a similar fate. He accepted an opportunity of changing his identity with that of a dead French prisoner, on condition that other officers would also be enabled to do so. In this way, he was instrumental in saving the lives of two officers.

Wing Commander Yeo-Thomas was later transferred to a work kommando for Jews. He attempted to escape, but was picked up by a German patrol. Upon claiming French nationality he was transferred to a camp for French prisoners of war near Marienburg. On April 16th, 1945, he led a party of 20 in a most gallant attempt to escape in broad daylight. Ten were killed by fire from the guards. Those who reached cover split up into small groups. Wing Commander Yeo-Thomas became separated from his companions after three days without food. He continued alone for a week and was recaptured when only 800 yards from the American lines. A few days later he escaped with a party of ten French prisoners, whom he led through German patrols to the American lines.

Wing Commander Yeo-Thomas thus

SERVICE AVIATION

turned his final mission into a success by his determined opposition to the enemy, his strenuous efforts to maintain the morale of his fellow prisoners, and his brilliant escape activities. He endured brutal treatment and torture without flinching, and showed the most amazing fortitude and devotion to duty throughout his service abroad, during which he was under constant threat of death.

Roll of Honour

Casualty Communiqué No. 564.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list, 245 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Cpl. W. H. Berrey; L.A/C. A. Blackburn; L.A/C. R. Branker; Cpl. D. J. Brown; Flt. Sgt. P. R. Condon; Flt. Sgt. A. J. Cottier; Flt. Sgt. R. H. Crighton; Flt. Sgt. F. Davis; Cpl. A. E. Deveson; Cpl. D. W. Ellis; L.A/C. H. G. Evans; Flt. Sgt. J. Freeland; Flt. Sgt. E. J. Furlong; L.A/C. A. G. George; F/O. S. Grayton; L.A/C. F. D. Harrington; L.A/C. L. E. Hildrow; W/O. K. M. Hodgson; L.A/C. K. W. Kilbank; F/O. W. C. Lewington; Cpl. L. G. Mason; Cpl. M. Moses; Flt. Sgt. D. McP. Murray; L.A/C. G. Parr; Cpl. D. L. Pratt; Sgt. F. Priestley; Cpl. W. F. S. Riley; Flt. Sgt. L. R. Saunders; Sgt. J. Stevens; Sgt. J. Stevens; Cpl. C. F. Venables; L.A/C. R. Williams; L.A/C. L. Williamson; A/C. D. W. Wright; Flt. Sgt. G. F. Wyke; L.A/C. F. S. Yates; F/O. G. V. R. Yeulett.

MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. J. C. N. Cunningham; F/O. D. Venning.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—F/O. G. F. Allan; Sgt. F. J. Angus; F/O. D. G. Bennett; Sgt. T. R. Borkett; Flt. Sgt. R. Brown; P/O. A. E. Diggins; P/O. J. Gilbody; F/O. P. S. Haw; Sgt. L. P. Hyde; Sgt. K. R. Mann; Sgt. J. G. Robinson; Sgt. J. G. Shewen; F/O. H. Stevenson; Sgt. S. W. J. Taylor; Flt. Lt. D. J. S. Turner; Sqn. Ldr. K. A. Wigglesworth, D.F.C.; Sgt. P. B. Wilson; Flt. Lt. E. A. C. Young.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. D. H. Acworth; Flt. Sgt. G. R. C. G. Adams; Sgt. L. Adams; Flt. Lt. D. Adcock; P/O. P. L. Alp; Sgt. J. S. Anderson; Flt. Sgt. A. Ashworth; Sgt. B. Bell; Act. W/O. R. Bennett; W/O. K. J. Bettles; Act. Flt. Lt. W. N. Bingham; Sgt. J. J. Birtles; F/O. J. D. Black; Sgt. E. B. Bland; F/O. G. Blanshard; Sgt. R. F. Bloy; Sgt. A. B. E. Booth; Sgt. L. B. Bourne; Sgt. J. R. Breeze; F/O. E. I. Britton; Sgt. C. Brown; P/O. W. F. Bunting, D.F.M.; F/O. A. G. Burgess; Flt. Lt. J. W. Caddie; Sgt. D. C. Carrott; W/O. R. O. Clee; F/O. P. W. Clifford; Flt. Sgt. W. Cobb; Sgt. M. Cody; Sgt. R. F. Cousin; Sgt. G. J. Crawley; Sgt. J. E. Cushing; P/O. E. C. T. Davies; Sgt. W. E. Double; Flt. Sgt. W. Edmondson; Flt. Lt. D. Edyvean; F/O. E. G. Essenhigh; Act. Wing Cdr. D. B. Falconer, D.F.C., A.F.C.; F/O. J. D. Farrar; Sgt. R. A. Forrest; Flt. Sgt. L. W. Fox; F/O. P. S. Foxcroft; Sgt. J. H. Gilliver; Sgt. E. Graham; F/O. R. Heald; Sgt. N. J. Hobbs; Sgt. L. Hodgson; Sgt. D. W. Holmes; P/O. E. P. Hughes; Sgt. J. B. Humphrey; P/O. K. T. Hutton; Flt. Sgt. J. M. Johnstone; Flt. Sgt. T. D. Jones; Sgt. J. E. Keogh; Sgt. J. Kerfoot; Sgt. G. Kirkby; Sgt. H. Lambert; F/O. G. F. Larcey; Sgt. I. W. Lewis; Flt. Sgt. F. P. Lyford; F/O. E. R. Lyon; Flt. Sgt. W. C. McIntosh; W/O. W. R. Macpherson; F/O. J. R. Mackney; Flt. Lt. D. L. Mathewman, D.F.C.; Sgt. E. W. Matthews; Act. Flt. Lt. P. T. F. May, D.F.M.; Sgt. D. G. Mayley; F/O. T. J. Middleton; Sgt. E. T. Money; Sgt. J. W. Moore; Flt. Sgt. I. J. Morris; Sgt. A. D. G. Morrison; Sgt. W. E. Moseley; Flt. Sgt. M. A. Murphy; Sgt. L. A. Newell; F/O. A. W. W. Nipper; Sgt. J. Norman, D.F.M.; Sgt. D. R. Northcote; Sgt. E. S. Pattison; Flt. Sgt. E. Peel; Sgt. S. J. A. Pegram; Flt. Sgt. W. D. Phillips; Act. F/O. P. M. Picot; Sgt. R. J. Pocock; Sgt. G. H. Postins; Sgt. E. L. Price; Flt. Lt. P. Quine; Flt. Sgt. F. B. Rees; Sgt. K. Roberts; F/O. D. Robson; Sgt. A. R. Roselt; Sgt. A. Rowe; P/O. F. C. A. Sawyer; Flt. Lt. B. L. Smith, D.F.M.; Sgt. W. J. Smith; Sgt. G. Spreadbury; Sgt. E. W. Starling; Flt. Sgt. A. B. Steele; Flt. Sgt. A. B. Steele; Flt. Sgt. G. E. Stenner; Sgt. S. Stone; Flt. Sgt. W. D. Stopford; Flt. Sgt. G. D. Taylor; Sgt. A. R. Thair; Flt. Sgt. H. R. Thomas; Sgt. S. W. Thompson; F/O. J. A. Thomson; Sgt. R. Turner; Flt. Sgt. J. W. Tutill; Sgt. H. Varey; Sgt. R. V. Wakefield; P/O. E. W. Walton; Flt. Sgt. R. J. Ward-Barrett; Sgt. A. Waterhouse; Flt. Lt. W. Weir; Sgt. S. A. Westcott; Flt. Sgt. F. Wharam; Sgt. L. W. J. White; Sgt. T. White; Flt. Sgt. T. W. Whitehand; P/O. R. G. Whybro; Sgt. B. F. W. Wilkinson; Sgt. T. H. Williamson; Sgt. J. S. Wilson; Sgt. R. H. F. Wilson; Flt. Sgt. A. R. Wincott; Sgt. B. Wood; Wing Cdr. H. de C. A. Woodhouse, D.F.C., A.F.C.; Act. F/O. C. E. M. Worner; Sgt. J. Wright.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Sgt. A. Allan; Sgt. R. W. B. Baldwin; F/O. E. Clarke; Flt. Sgt. T. D. Cremins; Sgt. B. C. F. Dean; Flt. Sgt. A. Eccleston; Flt Sgt. E. J. Hobbs; Sgt. T. B. R. Horrocks; Sgt. F. W. Johnson; Flt. Sgt. K. Mannion; Sgt. E. Markson; Sgt. S. B. Morgan; Flt. Sgt. J. W. Nicholls; Flt. Sgt. G. A. O'N. Oliver; Flt. Lt. E. H. M. Relton; Sgt. A. A. Rivera; Sgt. E. J. Smallidon; F/O. W. J. Wallace; Sgt. L. A. Williams.

MISSING.—F/O. F. D. Irvine; Act. Sqn. Ldr. R. W. S. Marshall.

KILLED ON ACTIVE SERVICE.—F/O. B. J. L. Armitage; Sgt. F. W. Brown; Flt. Sgt. G. Cook; L.A/C. L. Coyle; Flt. Sgt. C. J. Frith; L.A/C. D. E. Jones; L.A/C. W. H. Lindsay; Act. Flt. Lt. W. C. MacIntyre; Sgt. D. E. H. Murrells; Sgt. F. H. Overall; Flt. Sgt. H. D. Pearce; L.A/C. H. N. Sandford; Cpl. T. F. Sandilands; Flt. Sgt. A. Stephen; F/O. F. F. Thomas; Flt. Lt. G. J. Tonks; F/O. B. S. Unwin; Sgt. R. Wynne.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. J. R. Aldridge; Sgt. F. K. Allan; Flt. Lt. D. M. Crook, D.F.C.; P/O. W. D. Livock; W/O. R. J. Taylor; Flt. Sgt. G. L. West.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—P/O. D. V. James; F/O. L. T. Jordan

WOUNDED OR INJURED ON ACTIVE SERVICE.—W/O. S. A. Baker; F/O. D. F. Moore.

DIED ON ACTIVE SERVICE.—L.A/C. J. W. Birchenall; Flt. Sgt. F. G. Clarke; L.A/C. H. G. Cooper; Sgt. P. G. Cullom; Sgt. C. E. Dinnage; Flt. Sgt. T. W. Dodds; P/O. W. A. Edley; Cpl. G. Forsyth; W/O. R. C. Gardner; Act. Flt. Lt. R. P. Garnett; A/C.2 R. Grimes; Sgt. W. N. Hamilton; L.A/C. G. A. Hummerston; L.A/C. J. Johnson; A/C.2 B. Letting; L.A/C. C. Mulvey; L.A/C. G. A. McK. Sinclair; Cpl. H. W. Stirling; L.A/C. C. H. Street; L.A/C. F. Tickner; L.A/C. W. J. Welsby; Act. F/O. S. D. Wildman; A/C.2 T. R. C. Wilmshurst.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. D. W. Davidson; F/O. J. A. Hakewill; Flt. Sgt. W. K. Loughnan; P/O. R. R. Mitchell; Flt. Sgt. K. A. G. Reed.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. S. J. Bethel; F/O. G. B. Collins; P/O. J. Costello; P/O. A. Duncan; Flt. Sgt. I. D. Dutfield; F/O. P. E. Edwards; Flt. Sgt. G. French; Flt. Sgt. C. L. George; Flt. Sgt. G. Hayman; P/O. E. J. Holmes; Flt. Sgt. A. F. Joyce; Flt. Sgt. A. Laing; Flt. Sgt. E. J. Leake; Flt. Sgt. N. A. L'Green; Flt. Sgt. G. M. Miller; Flt. Sgt. M. L. Morey; F/O. W. Nicholson; Flt. Sgt. G. G. Parker; Act. F/O. J. B. Plumridge; F/O. G. D. Rawson; F/O. N. L. Redford; F/O. J. M. Scott, D.F.M.; Act. F/O. H. J. Thompson; P/O. D. Underwood; Flt. Sgt. D. Wham; Flt. Lt. D. J. Wilson; P/O. M. McI. Wilson.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Flt. Sgt. C. H. Edwards; F/O. R. F. Feilberg; Flt. Sgt. D. W. McConville; Flt. Sgt. J. K. Scott; F/O. W. R. Sinclair; P/O. J. A. Picken.

KILLED ON ACTIVE SERVICE.—W/O. P. L. R. Boucat; Flt. Sgt. G. K. Gibb; Flt. Lt. M. C. Partridge; Flt. Lt. H. Turner.

R.A.F. WAR COMMANDERS

Air Chief Marshal Sir John Slessor

(Caricature portrait by Hayden)

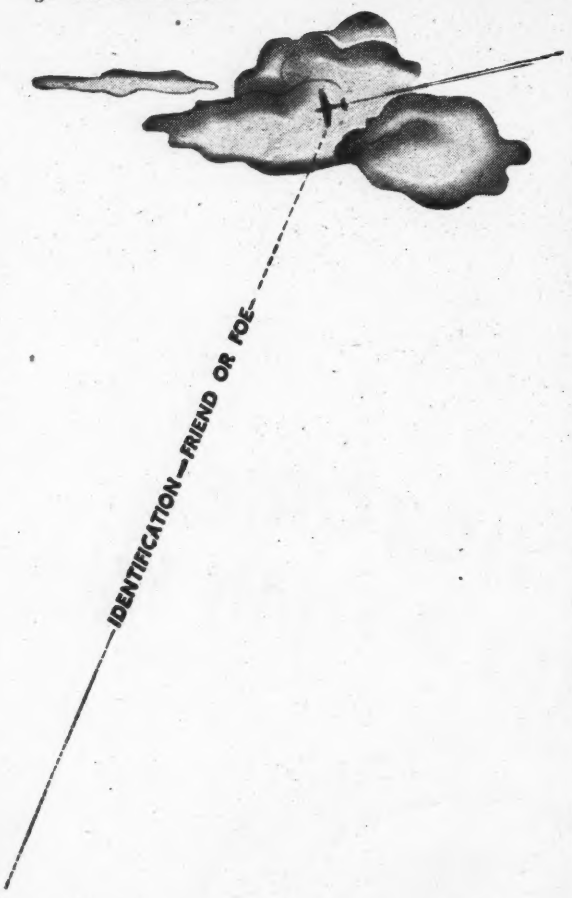
MANY of those in a position to form an opinion say that the Royal Air Force has few keener brains than that of Air Chief Marshal Sir John Slessor, K.C.B., D.S.O., M.C., who is now Member of the Air Council for Personnel. At the outbreak of war he was Director of Plans at the Air Ministry, an important post, which was especially significant in view of the fact that Sir John had published in 1936 a book entitled *Air Power and Armies*. This was based on a series of lectures which he delivered when he was an instructor at the Army Staff College at Camberley. In this book he gave his own views, looking at air power as an adjunct to an army, and upholding the doctrine that when army operations are in progress they must take precedence of strategic bombing. This principle was followed during the Allied invasion of the Continent in 1944-45. This book will be valuable to students of war for years to come.

Littera scripta manet, and this book may well outlive the memories of what its author did during the second world war—or the first world war, for the matter of that, in which he gained the Military Cross. But, all the same, Sir John made his weight felt during the second struggle with the Germans. In November, 1942, he was appointed A.O.C.-in-C., Coastal Command, and held that post until January, 1944. The year 1943 was a critical one in the Battle of the Atlantic. The U-boats had become a grave menace; but in the summer close co-operation between Coastal Command and the Navy resulted in a major defeat being inflicted upon them. In that year many more U-boats were destroyed by Coastal Command than had fallen victims to aircraft in the three preceding years of the war.

On quitting Coastal Command, Sir John Slessor became A.O.C. the R.A.F. in the Mediterranean, and was also Deputy to General Ira Eaker, who was then Air Commander-in-Chief, Mediterranean Allied Air Forces. The chief interest had by that time shifted to the North and the preparations for the invasion of Normandy; but there was still plenty of air work to be done in Italy and the Ægean, and later there was the French invasion of the Riviera.

It is really unnecessary to add that Sir John has passed through the R.A.F. Staff College at Andover. Such a man could never have failed to secure the qualification of *p.s.a.* after his name in the *Air Force List*.

PEACE HATH HER VICTORIES
NO LESS RENOWNED THAN WAR
MADE IN ENGLAND
BALL & ROLLER
R&M
BEARINGS
RANSOME & MARLES
BEARING CO. LTD.
NEWARK ON TRENT
ENGLAND



FRIEND or FOE? *From the beginning of the War Hoover Limited made the Power Unit Rotary Transformer of the telltale "echo" device which signalled "friend" automatically. Rotary electrical equipment of all types, including fractional h.p. motors, was made by Hoover Limited for a host of purposes during the war. The latter are available in peace, too, for those whose plans call for them. If you are interested, get into touch with us now.*

HOOVER LIMITED

Makers of the World's Best Cleaner

HOOVER LIMITED · PERIVALE · GREENFORD · MIDDLESEX

POST-WAR SUPPLIES OF

Leathercloth

COTTON is an essential raw material in the production of leathercloth. Cotton fabrics are, however, in short supply, and any improvement will only be on a gradual scale. Meantime we shall continue to supply leathercloth to customers under quotas, this having been found to be the fairest method of distribution.

Where firms have, or can acquire, suitable base fabric, we shall be pleased to quote for its processing into leathercloth. A sample of the fabric should be submitted. Only cloths in the grey or bleached state can be considered.

ICI

IMPERIAL CHEMICAL INDUSTRIES LIMITED
LEATHERCLOTH DIVISION, HYDE, CHESHIRE
Telephone: HYDE 651 • Telegrams: REXINE, HYDE
R.A.749

SERVICE AVIATION

Royal Canadian Air Force

KILLED IN ACTION.—Flt. Lt. S. M. Cole; F/O. G. E. McPherson; W/O. D. D. Schurr; F/O. J. C. Todd; F/O. D. A. Twaddle.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. D. A. Carson.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW REPORTED KILLED IN ACTION.—P/O. R. F. Breen; F/O. J. F. Warrell.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—F/O. B. S. Corbett; F/O. A. E. Hall; F/O. C. H. Howald; P/O. N. A. Hurst; F/O. P. Koleda; W/O. D. McL. Lindsay; Flt. Lt. N. D. Mara, D.F.C.; F/O. W. L. Melbourne; F/O. J. A. Murphy; Flt. Sgt. M. O. Orr; P/O. E. Simonato; F/O. A. J. Tyrrell.

MISSING.—Sgt. H. H. Andrews; F/O. R. MacK. Clarke; Sgt. D. L. Dellis; P/O. G. Faulkner; F/O. R. G. H. Fisher; Sgt. R. Giesbrecht; Flt. Sgt. G. W. Hill; Flt. Sgt. J. C. Hodichak; Flt. Sgt. P. N. Humeniski; P/O. W. P. McLeod; P/O. J. J. P. Perron; P/O. W. W. Reeve; F/O. F. R. Ross; F/O. A. F. Timmermans; Flt. Sgt. S. J. Veres.

DIED ON ACTIVE SERVICE.—L.A/C. P. E. A. Rawlings.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Flt. Sgt. T. Waaka; Flt. Lt. N. P. Whaley, D.F.C.

South African Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Lt. D. Fietze; Lt. B. A. Bird; W/O. R. Brice; Capt. G. S. Brink; Lt. D. W. Dodd; Lt. E. G. Ellio-Wilson; Capt. D. Judd; W/O. N. A. McNamara; Lt. T. W. Megaw; 2/Lt. Y. B. Mills; W/O. J. M. Z. Posthumus; W/O. G. W. H. Trezona; Capt. T. A. M. Van Der Spuy.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—W/O. A. F. Kelland; Lt. H. C. Palmer.

DIED ON ACTIVE SERVICE.—Lt. M. P. Farrell.

Casualty Communiqué No. 565.

Of the names in this list 249 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. G. S. Crosse; P/O. J. E. Ede; Sgt. J. L. Humphreys; Flt. Sgt. D. Rose; Flt. Sgt. G. E. Staines; Sgt. A. A. Webb.

MISSING BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. J. H. Nutter.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—F/O. A. D. Adamson; Flt. Sgt. A. G. O. Bellamy; F/O. R. Curzon; Flt. Sgt. A. Elbogen; Flt. Lt. J. T. W. Morris; Flt. Sgt. J. O'Callaghan.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. S. R. Alcock; Sgt. S. G. A. Ansell; Flt. Sgt. R. Armstrong; Sgt. R. I. Atkinson; Sgt. L. Ayres; Flt. Lt. J. P. Ball; Sgt. J. T. Barber; F/O. G. R. Bradley, D.F.M.; Sgt. A. L. Barkshire; Sgt. C. Barnes; Sgt. F. G. Barrett; Act. Flt. Lt. J. P. D. Bartleet; Flt. Lt. C. F. Bedell, D.F.C.; Act. Flt. Lt. W. J. Bell; Sgt. T. C. Berry; Flt. Sgt. R. H. Bloomfield; Flt. Lt. H. S. Boardman, D.F.C.; Sgt. L. H. J. Borley; F/O. G. W. Bovett; Sgt. E. E. Boyce; Sgt. J. T. Boyd; Act. F/O. A. C. Brooks; F/O. H. C. Bryant, D.F.C.; Sgt. W. F. Bullard; Sgt. N. Carncross; P/O. R. M. Cass; Sgt. W. F. Chambers; Flt. Sgt. F. Chew; Sgt. C. Clay; Sgt. C. Cletheroe; Act. Sqn. Ldr. J. B. Coates, D.F.C.; F/O. S. H. Coleman; Sgt. V. C. Cornish; P/O. S. Corran; P/O. A. F. Cowling; Act. Flt. Lt. O. R. Cramer; W/O. C. T. Crawley; Flt. Sgt. E. L. Cull; Sgt. R. W. Davies; P/O. J. Dean; F/O. F. J. Dell; W/O. L. A. Ding; Flt. Sgt. E. W. Donkin; Sgt. L. Duncan; Act. Flt. Lt. D. G. Evans; Sqn. Ldr. A. L. Farrington; Sgt. J. V. Finney; P/O. B. B. Furniss; W/O. L. Fynn; Sgt. H. C. Gardner; F/O. A. R. Gaskell; Flt. Sgt. H. Gordge; Sgt. L. P. Gower; Sgt. L. F. Grindle; Sgt. S. H. Grover; P/O. P. H. Groves; Sgt. J. Harper; Sgt. W. L. Healey; Flt. Sgt. J. Henderson; Sgt. L. B. Hewitt; Flt. Sgt. J. M. Hewlett; F/O. M. Hills; F/O. R. Holmes; Sgt. W. Horner; Sgt. F. Howard; Flt. Lt. P. N. Howard; F/O. G. E. W. Howells; Sgt. J. Hughes; Sgt. A. A. Hull; Sgt. L. A. V. Hunt; Flt. Lt. A. C. S. Innes; F/O. H. W. James; Flt. Sgt. E. W. Jenner; Flt. Sgt. D. R. Jones; F/O. K. Jones; Flt. Sgt. T. J. Jones; F/O. E. A. L. Kemp, D.F.C.; Flt. Lt. K. E. Kimber; F/O. J. S. Lang; Sgt. R. A. Lee; Flt. Sgt. L. A. Lenox D.F.M.; Flt. Sgt. G. T. Lewis; Sgt. R. I. Lewis; Sgt. R. Leyland; Flt. Sgt. A. Lister; Sgt. W. E. Lynch; Sgt. F. J. A. McCambridge; Sgt. A. MacKay; Sgt. R. MacLeod; Flt. Sgt. W. R. O. Matthews; Sgt. A. A. R. Metcalfe; Sgt. R. Millar; Flt. Sgt. J. S. Mitchell, D.F.M.; Sgt. J. M. Moore; P/O. J. R. Mordan; Sgt. R. D. Morgan; Sgt. F. Myers; Sgt. T. Neilan; Sgt. E. W. Newton; Flt. Sgt. T. G. Nottingham; P/O. D. W. Noyes; Sgt. P. M. O'Donnell; Sgt. J. E. O'Fee; F/O. J. W. Oldham, D.F.M.; Sgt. E. L. Owen; Act. Flt. Lt. A. J. Page; Flt. Sgt. T. E. Passage; Sgt. L. Peace; Sgt. J. Reid; Flt. Sgt. J. E. Richardson; F/O. F. C. Riley; F/O. E. Roberts; Sgt. D. L. J. Rolfe; Sgt. F. C. Saunders; P/O. M. Savage; Flt. Sgt. W. H. Scott; Flt. Lt. S. L. Scutt; Flt. Sgt. F. J. W. Shane; Sgt. A. G. Shavler; Sgt. C. P. Shotton; F/O. H. J. Shute; P/O. H. Silverwood, D.F.M.; Flt. Sgt. J. L. Simpson; P/O. R. M. Simpson; Flt. Sgt. G. H. Sims; F/O. J. N. Sincock; Sgt. J. A. Slade; F/O. H. N. Smith; Sgt. R. C. Smith; Act. Flt. Lt. J. B. P. Spencer; Sgt. S. J. Spooner; Sgt. A. E. Stannard; Sgt. A. H. Steers; Sgt. A. Stewart; Act. Flt. Lt. L. H. Such; Sgt. R. Tabener; Sgt. H. P. Tomlinson; Flt. Sgt. L. R. Tont; Sgt. G. H. Trigwell; Flt. Sgt. T. J. Tucker; P/O. S. G. Twining; Sgt. T. B. Utterson; P/O. J. W. Walker; P/O. K. L. Walker; Sgt. J. Watkinson; Sgt. E. N. Watson; Flt. Sgt. J. Watts; Sgt. M. J. Watts; Flt. Sgt. G. C. Wells; Sgt. F. G. Wenham; Sgt. W. G. E. West; Sgt. J. C. Wiggin; Sgt. J. Wilkins; Sgt. D. Wilkinson; W/O. J. Williams; F/O. W. R. Woodcock; Sgt. S. A. G. Woodford.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW REPORTED KILLED IN ACTION.—Flt. Sgt. A. Atkin; P/O. R. Connon; Flt. Sgt. A. S. Davison; Act. Sqn. Ldr. A. S. R. E. Ennis, D.S.O., D.F.C.; Flt. Sgt. W. E. G. Griffin; Flt. Sgt. E. C. Gunning; Flt. Sgt. D. R. Rees.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Sgt. C. G. Bragg; F/O. K. J. Dorricott; Sgt. S. Fielding; Sgt. J. L. Fyfe; F/O. S. Gale; P/O. A. G. Gleeson; Flt. Lt. G. S. Henderson; Sgt. J. Hodgson; Sgt. P. R. Kewn; Flt. Sgt. C. A. Longland; Flt. Sgt. D. S. Lowe; Flt. Sgt. J. H. Morgan; Flt. Lt. D. Pollard; P/O. G. E. Rhead; Sgt. J. W. Smith; P/O. G. L. Sorrell; Flt. Sgt. E. Stewart; Sgt. J. G. Whitworth.

WOUNDED OR INJURED IN ACTION.—Sgt. R. Crossley; Sgt. L. W. Simpson.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. S. Hinds; W/O. A. Smith.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. P. W. Higdon.

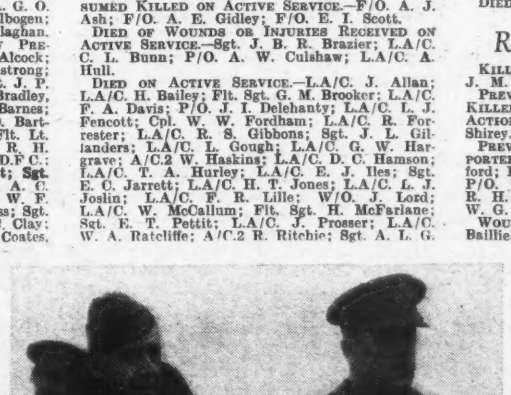
MISSING.—Flt. Sgt. A. J. Coleman; F/O. D. C. M. Elias; W/O. M. H. Harris.

KILLED ON ACTIVE SERVICE.—Flt. Lt. N. Birtwistle; Flt. Lt. T. Clay; F/O. J. Coxe; F/O. B. T. Cracknell; W/O. L. T. Dash; F/O. C. Davies; F/O. G. Donaldson; F/O. R. F. Double; F/O. G. M. Eden; Flt. Lt. V. G. Eden; Flt. Sgt. R. P. Elston; Flt. Lt. L. Green; Flt. Lt. W. Gregson, D.F.C.; P/O. J. R. Guest; A/C.2 G. Hullah; Flt. Sgt. N. P. Jones; Sgt. A. H. McIntosh; Flt. Sgt. T. D. Moren; Flt. Lt. J. D. Nicoll; Sgt. W. S. K. Norton; F/O. A. O. Pearson, D.F.C.; Act. Sqn. Ldr. H. R. Poolev; Flt. Sgt. T. Potter; Flt. Lt. R. W. Hobson; Flt. Lt. N. Russell, D.F.C.; Flt. Sgt. K. P. Sartin; F/O. H. Signey; Flt. Lt. E. B. Sillito, D.F.C.; F/O. H. A. Smith; F/O. G. Summers; Sgt. K. E. Terry; Sgt. T. C. T. Waddingham; L.A/C. N. L. Wade; Sgt. F. T. Wright.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. A. J. Ash; F/O. A. E. Gidley; F/O. E. I. Scott.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. J. B. R. Brazier; L.A/C. C. L. Bunn; P/O. A. W. Culshaw; L.A/C. A. Hull.

DIED ON ACTIVE SERVICE.—L.A/C. J. Allan; L.A/C. H. Bailey; Flt. Sgt. G. M. Brooker; L.A/C. F. A. Davis; P/O. J. I. Delehanty; L.A/C. L. J. Fencott; Cpl. W. W. Fordham; L.A/C. R. Forrester; L.A/C. R. S. Gibbons; Sgt. J. L. Gillanders; L.A/C. L. Gough; L.A/C. G. W. Hargrave; A/C.2 W. Haskins; L.A/C. D. C. Hamson; L.A/C. T. A. Hurley; L.A/C. E. J. Iles; Sgt. E. C. Jarrett; L.A/C. H. T. Jones; L.A/C. L. J. Joslin; L.A/C. F. R. Lille; W/O. J. Lord; L.A/C. W. McCallum; Flt. Sgt. H. McFarlane; Sgt. E. T. Pettit; L.A/C. J. Prosser; L.A/C. W. A. Ratcliffe; A/C.2 R. Ritchie; Sgt. A. L. G. Roberts; L.A/C. J. H. Robinson; L.A/C. G. B. Smith; W/O. K. G. E. Stanley; Sgt. J. A. A. Talbot; L.A/C. I. W. Thomson; A/C.1 A. Wignall.



NEW CHIEF OF B.A.F.O.: Air Marshal Sir H. E. P. Wigglesworth, K.B.E., C.B., D.S.C., the new C.-in-C. of the British Air Forces of Occupation, photographed with Genera Fielden, C.B.E., of B.A.O.R.

Badge of No. 11 M.U., Royal Air Force—"Mea Tela Nocent" (My Weapons are Deadly).

Badge of No. 353 Squadron, Royal Air Force—"Fear Naught in Unity."

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—L.A/CW. E. Melrose.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. A. Y. Cousins; Act. F/O. V. Davis; P/O. J. H. Furness; P/O. J. T. Lowe; P/O. F. G. Sides; P/O. R. W. Skilbeck.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. G. H. Baily; Flt. Sgt. N. B. Bird; F/O. G. S. Brown; P/O. N. W. Everett; Act. F/O. T. F. Eyre; F/O. B. C. Howard; W/O. G. W. Lieis; Flt. Sgt. R. J. McQuitty; F/O. J. Maguire; F/O. H. L. Motteram; Flt. Sgt. J. A. Murphy; P/O. W. T. Peters; F/O. E. E. Quinlan; Act. Flt. Lt. A. J. Rate; F/O. B. C. Reid, D.F.C.; Flt. Sgt. P. A. Robson; W/O. M. J. G. Schultz; Flt. Sgt. R. P. Singleton; Flt. Sgt. W. A. Slade; Flt. Sgt. L. G. Speak; P/O. V. J. Trunk; W/O. J. P. Whelan.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Flt. Sgt. K. L. T. Dickerson; Act. Wing Cdr. G. Panitz, D.F.C.; P/O. W. A. H. Vaughan; Flt. Lt. R. S. Williams, D.F.C.

KILLED ON ACTIVE SERVICE.—W/O. J. S. Elwood; W/O. G. Pratt.

WOUNDED OR INJURED ON ACTIVE SERVICE.—F/O. B. D. Bancroft, D.F.C.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—F/O. J. J. Allen, D.F.C.; F/O. W. J. Tolliday.

DIED ON ACTIVE SERVICE.—Cpl. F. Gregson.

Royal Canadian Air Force

KILLED IN ACTION.—W/O. J. M. Cox; Flt. Lt. J. M. Rice.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW REPORTED KILLED IN ACTION.—Sgt. J. McI. Davidson; F/O. J. W. Shirey.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—F/O. P. W. Bickford; P/O. W. E. Blunderfield; F/O. R. L. Cann; P/O. D. Dawson; P/O. D. G. Flood; Flt. Lt. R. H. Galbraith; Flt. Sgt. V. J. Lazier; F/O. W. G. Scanlan.

WOUNDED OR INJURED IN ACTION.—F/O. J. J. Baillie.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. V. F. McClung.

DIED ON ACTIVE SERVICE.—L.A/C. R. K. Nicholson.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Act. Sqn. Ldr. E. L. Joyce, D.F.M.; Flt. Sgt. S. E. Sadler.

DIED ON ACTIVE SERVICE.—W/O. C. J. Rudge.

South African Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—W/O. N. H. Attwell; W/O. E. W. Aylett; Lt. J. H. Dutol; Capt. Hadietrich; 2/Lt. W. T. Nagel; Lt. H. P. Oosthuizen; Lt. G. A. Roy

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—2/Lt. C. Campbell; Capt. V. B. Duckitt; Lt. L. C. Forayth; Lt. G. Morgan; Lt. S. F. Wentzel.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Capt. H. E. K. Edwardes.

THE INDUSTRY

Dickinsons in Battle Dress

Drop-tanks : Fairings and Magnetos

IT is no easy matter to make an industrial documentary film interesting to those outside the trade concerned, but "Dickinsons in Battle Dress," which shows the wartime activities of John Dickinson and Co., Ltd., Apsley Mills, Hemel Hempstead, proves that it can be done if the job is tackled in the right way. Basically it demands the correct approach plus skilled direction by those experienced in the highly specialised art of film-making; the firm's own amateur, armed with nothing but his movie-camera and his enthusiasm, can rarely get away with it.

As the normal pre-war activities of Dickinsons had nothing to do with aircraft (unless they made those little paper bags provided with such unobstrusive thoughtfulness for gastronomically unstable airline passengers?) it may be as well to mention that this firm manufactured such innocuous articles as envelopes, notepaper, books, and other forms of paper goods needed in home and business. When the war came and it was realised that many munitions could be made from paper, it was not surprising that Dickinsons were called upon to turn out vast numbers of thread protectors, drop-tanks, aircraft fairings, and other things made up of laminated paper. What *was* surprising was that they also blossomed out as precision engineers and were soon producing aircraft magnetos, sparking plugs, oil filters, hydraulic pumps, electro-pneumatic jacks, electric fuel booster pumps, and even mortar bombs and bullets.

To turn from paper bags to projectiles was no mean achievement, yet this firm modestly says that its film shows only what was typical of many another British firm, and was made very largely "with the idea of letting the boys who went into the Forces see what we've been up to while they were away."

Starting with this right approach, they have produced a documentary directed with imagination. Man is more important than the machine, and thus the film conveys a real atmosphere of human endeavour instead of being—as it so easily might have been—just a cold catalogue of factory processes.

N. D. R.

Sqn. Ldr. B. H. Arkell, known in the Royal Air Force as the helicopter wizard, has joined the Fairey Aviation team of test pilots.

NEW VENTURE

THE name of Fairey will shortly be heard of in connection with a new product. It is for places where there is water but it is not for the Naval Air Arm.

IN CANADA

PERCIVAL AIRCRAFT, LTD., have opened a branch office at the de Havilland Airport, Postal Station 1, Toronto 10, Canada. Mr. J. F. Carroll will be acting manager. Opening this new branch does not mean that Percivals intend to manufacture aircraft in Canada.

FOR ARTILLERY OBSERVATION

THE Heston Aircraft Company are busy at the moment turning out a new A.O.P. (Air Observation Post) aircraft. Three qualities are essential: Perfect view, low landing speed, and a reliable engine to run on common or garden motor spirit.

TO INCREASE OVERHAUL PERIODS

ONE of the largest oil companies has written to the British Society of Associated Filter Manufacturers — of which body Mr. C. G. Vokes is President—suggesting co-operation in filtration technique. Following an application by the Society, a committee has been formed by the British Standards Institution to go into the problems of test procedure and specifications for filters.

NEWS OF FOKKERS

THE Dutch Fokker company are now building gliders and are shortly expecting a contract from K.L.M. (Royal Dutch Air Lines) to convert a number of Dakotas for civil use.

FUEL GAUGE APPROVED

THE new Simmonds *Pacitor* electronic fuel contents gauge, exclusively described in *Flight*, Feb. 21st, has been fully approved by M.A.P. for use on all British aircraft. It is actually in use on the Vickers Viking and Windsor, the Fairey Spearfish, Hawker Fury and Supermarine Spiteful.

From America comes the news that American Airlines have ordered it to be incorporated in their fleet of 50 Skymasters, and it is also specified for the Douglas D.C.6.

AIRCRAFT UPHOLSTERY

MR. GEORGE GRIFFITH, O.B.E., has recently been appointed a director and general manager of the Pullman Spring-Filled Company.

The company's major business before the war was the production of spring interiors for mattresses and upholstery. They are, however, now going in for a big expansion scheme which will include the manufacture of spring seats for aircraft in addition to railway carriages, cars, ships, etc.

From September, 1939, until the end of 1945, Mr. Griffith was with the Ministry of Aircraft Production as Director of Regional Organisation.

AIR TRAVEL

MR. L. G. ROGERS, a member of the staff of Thos. Cook and Son, Ltd., for 27 years, has been appointed head of the Air Travel Department, Berkeley Street, London, W.1, in succession to Mr. C. P. Burgess, who is retiring.

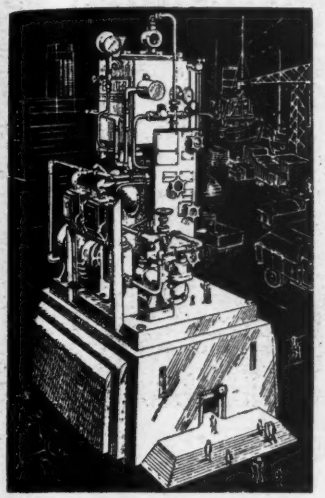
DECCA APPOINTMENTS

MR. H. F. SCHWARZ has been appointed vice-chairman of the Decca Navigator Co., Ltd., and Group Capt. E. Fennessy, Chief Engineer of the R.A.F. Radar Group before his recent release from the Service, has been made a director and will be responsible for the company's development of radio and radar flying aids, with particular application to civil requirements.

EXTENSIONS BY BAKELITE

DURING the war, Bakelite, Ltd., embarked on the production of Polyvinyl chloride extrusion compounds for cable covering, etc. These materials assisted in the alleviation of the difficult position created by the failure of natural rubber supplies. The production of Polyvinyl resins and compounds is now to be a permanent feature of the company's activities and new buildings for this purpose are now in process of erection on a 38-acre site at Aycliffe, near Darlington, Co. Durham.

A Monument to Saving



The Metafilter is a monument to an enormous saving of valuable oils and still more valuable time. For the Metafilter not only frees lubricating oils, cutting oils, and coolants from suspended impurities and completely removes even the finest ferrous swarf—considered hitherto impossible to trap—but it also enhances the quality and speed of production.

Metafiltration

THE METAFILTRATION COMPANY LTD.
BELGRAVE ROAD, HOUNSLOW, MIDDLESEX
Telephone: Hounslow 1121/2/3. Telegrams: Metafilter, Hounslow

ANNOUNCING
THE NEW EDITION OF

Jane's

ALL THE WORLD'S AIRCRAFT

1945-46 EDITION

EDITED BY LEONARD BRIDGMAN

This unique publication is now in the 34th year of issue, and the latest edition contains an unusually large proportion of new matter and illustrations dealing with the most recent developments in world aviation.

Over 2,000 illustrations, £3 : 3 : 0 net.

TO BE PUBLISHED IN MARCH

SAMPSON LOW, MARSTON & CO. LTD.
43 LUDGATE HILL, LONDON

Offkwik

PAINT REMOVER

VULCAN PRODUCTS LTD

SLOUGH and 24 Ryder St. St. James. S.W.1. Abbey 4161 (5 lines)

We are manufacturers of Bushes and Bearings for the

DE HAVILLAND

new range of

GIPSY ENGINES

· GIPSY MAJOR Series 30 and 50 ·
GIPSY QUEEN Series 30, 50 and 70

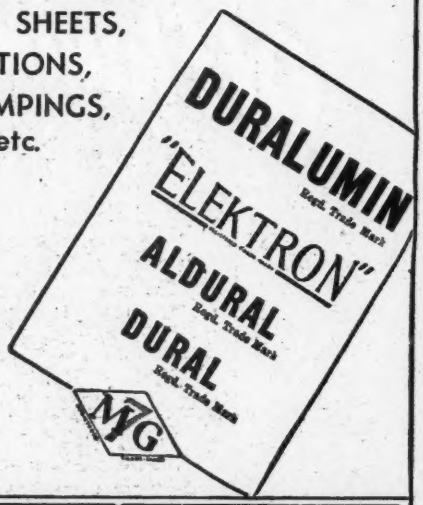
'BIRSO' Non-Ferrous CASTINGS

Fully approved by Admiralty and A.I.D.

883

T. M. BIRKETT & SONS. LTD.
HANLEY · STAFFS
'Grams: Birkett, Hanley 'Phone: Stoke-on-Trent 2184-5-6

MANUFACTURED IN RODS, TUBES, FORGINGS, WIRE, STRIP, SHEETS, SECTIONS, STAMPINGS, etc.



JAMES BOOTH & COMPANY LIMITED.
BIRMINGHAM, 7. Telegrams: BOOTH, BIRMINGHAM.

THE BRITISH AVIATION INSURANCE COMPANY LTD.
UNDERWRITER & PRINCIPAL SURVEYOR: CAPT. A. G. LAMPLUGH.
3/4, LIME ST., LONDON, E.C.3.
Tel.: Mansion House, 0444 (6 lines).

BRITISH AVIATION SERVICES LTD.
MANAGING DIRECTOR: AIR COMMODORE G. POWELL, C.B.E.
15, LIME ST., LONDON, E.C.3.
Tel.: Mansion House 2132.

9005

Cut the Cost of inside transport

by using "AUTOSET" Full Ball or Roller bearing castors with 2" to 16" Wheel.

Range includes all types of head fittings with

LOADS UP TO 6 TONS EACH

(Please mention 'Flight' when enquiring)
Enquiries for other types carrying from a few lbs. to 6 tons per Castor invited.

AUTOSET

AUTOSET (PRODUCTION) LTD.
Manufacturing Engineers (Estd. 1919)
STOUR ST., BIRMINGHAM, 18. 'Phone: Edg. 1143/4

Hoyt
BEARINGS & BEARING METALS

SEND FOR OUR BEARING HANDBOOK
and for details of
NUMBER ELEVEN
THE HIGHEST QUALITY BABBITT METAL, PROVED BEST FOR BEARINGS OF AERO ENGINES

"The Hoyt Book on the Lined Bearing" (36 pages) and supplement, "The Simplicity of Good Babbitting Revealed by Camera" (16 pages). The combined publications contain a wealth of information on bearings and bearing metals. Please enclose 6d. in stamps for postage, etc.

HOYT METAL Co., Ltd., Deodar Rd., London, S.W.15.

Designed for
MODERN AIRCRAFT
BECLAWAT FIXED OR DIRECT VISION PANELS OF ANY TYPE, AND COMPLETE HOODINGS

BECKETT, LAYCOCK & WATKINSON LTD., Acton Lane, London, N.W.10.
'Phone: ELGAR 5403-4-5. 'Grams: Beclawat, Phone, London.

BAKELITE

TREFOIL

REGD. TRADE MARK

PLASTICS

Information concerning the chemical and physical properties of the above materials is available from

BAKELITE LIMITED

Pioneers in the Plastics World

18 GROSVENOR GARDENS, LONDON, S.W.1

T41G

"Sestrel"

THE COMPASS WITH A PEDIGREE FOR THE PLANE OF THE FUTURE

HENRY BROWNE & SON LTD. BARKING, ESSEX
Telephone: RIPPLEWAY 4054/8 *Telegrams:* SESTREL, BARKING
Service Depot: 71, LEADENHALL STREET, LONDON, E.C.3. (AVENUE 2156/7)

Contractors to the Admiralty and Air Ministry

5 good reasons

why you should consider "Pytram" Seamless Air Conditioning Ducts and Piping.

1. ***Ease of production for the most complex shapes.***
2. ***Has a temperature range from -70° C. to 200° C.***
3. ***Good insulating properties obviating lagging.***
4. ***Freedom from drumming.***
5. ***Extreme lightness.***

Approved A.I.D. Air Ministry Authority Ref. No. B 123853/40.

Moulded and Produced in
LAMINATED CELLULOSE FIBRE

by

PYTRAM LIMITED

PYTRAM WORKS,
DUNBAR ROAD,
NEW MALDEN, SURREY.
Telephone: Malden 3225 (2 lines).
Telegrams: Pytram, New Malden.

Sole Licencees in Australia, N.Z.
AIRCRAFT DEVELOPMENT PTY. LTD.,
STATE THEATRE BUILDINGS,
SYDNEY, NEW SOUTH WALES.

Specialists in leather

..webbing, fabrics, vulcanized fibre products, etc. for the aircraft industry

There are possibilities in the application of leather, webbing, fabrics, vulcanized fibre etc., to modern aircraft construction which may be hidden from all but the expert. From their half a century's experience, Brooks have been able to contribute improvements in technique, new applications and short cuts to better production. Brooks can help you.

B'ham CENtral 3671

BROOKS

Famous for
BROOKS SADDLES & ACCESSORIES
"ANTLER" TRAVEL GOODS

J. B. BROOKS & CO. LTD., BIRMINGHAM

FLYING SUITS

in fine quality serge finished drill. Zip fastening front, legs and cuffs. In khaki, white or navy ... **47/6**
(4 Coupons required)

COMBINATION FLYING SUIT, in super quality fawn gabardine. Heavy fleece lined, zip front, legs, etc., **£7.15.0**
(18 Coupons)

LEATHER and GABARDINE JACKETS, ¾ length. Fleece lined, zip front and cuffs.

LUXOR GOGGLES, **50/-**. TRIPLEX GOGGLES, from **7/6** and **17/6**.

NATURAL SHEEPSKIN GLOVES, lambswool lined, **32/6** per pair. Double texture SILK UNDER-GLOVES, **12/6** per pair. (2 Coupons).

PRICES INCLUDE PURCHASE TAX.
Catalogue on receipt of 1d. stamp.

TURN UNWANTED KIT INTO CASH.
We pay TOP PRICES for *worn* Irvine type jackets, sheepskin lined boots and jackets, leather jackets, flying suits, etc. Call or write. If writing, state full particulars.

D. LEWIS LTD. (Dept. F.)

124, GT. PORTLAND ST., LONDON, W.1
No other London address.
Tel.: Museum 4314. Tele.: Aviakit, Wesdo, London

"ENGINEERING OPPORTUNITIES"

IMPORTANT GUIDE

This unique handbook, "Engineering Opportunities," outlines over 200 Courses of technical instruction, including **Aeronautical Engineering, Aeronautical Design, Aero Engines, Air Navigation, Ground Engineers' Licences. A.F.R.Ae.S., A.M.I.Mech.E., R.A.F. Maths.**, etc., etc. Our Courses have been approved by the **Royal Aeronautical Society** and

WE GUARANTEE
"NO PASS—NO FEE"

A copy of this enlightening guide to well-paid posts will be sent on request—**FREE.**

BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY
306, Shakespeare House, 17-19, Stratford Place, London, W.1.

COTTON BAGS
FOR SPARE PARTS, Etc.
WALTER H. FELTHAM & SON, LTD.,
Imperial Works, Tower Bridge Road,
Telephone: HOP 1784. **London, S.E.1**

Rate 3/- per line, minimum 6/- per paragraph. Special rates: Auctions, Contracts, Patents, Legal and Official Notices, Public Announcements, Tenders, 4/- per line, minimum 8/- per paragraph. Situations Wanted advts. 3d. per word, minimum 4/-. Box Nos., 4 words, plus 1/-. Press day, 1st post Friday. No responsibility accepted for errors. Remittances payable to :—"Flight" Publishing Co., Ltd., Dorset House, Stamford St., London, S.E.1.

AIRCRAFT FOR SALE AND WANTED

W. S. SHACKLETON, Ltd., 175, Piccadilly, London, W.1,
CAN offer reconditioned or new aircraft; packing, shipping and insurance arranged anywhere.—Write for particulars to W. S. Shackleton, Ltd. [0070

R. K. DUNDAS, Ltd., are booking orders for all types of new aircraft; order yours now!
R. K. DUNDAS, Ltd., also have available the following second-hand aircraft, all with C. of A., ready to fly :—
MILES Sparrowhawk; £900.
WICKO; £800.
PERCIVAL Proctor; £1,300.
MILES Falcon; £2,000.
STINSON Voyager; £850.
STINSON 5-seater; £2,200.
R. K. DUNDAS, Ltd., The Airport, Portsmouth. Tel. Portsmouth 74874. [0215

WANTED, 2 Taylorcraft and similar, in fair condition.—A. B. Golay, 7, Maychurch Close, Stanmore, Middx. [6624

FOR sale, Comper Swift, 75hp Pobjoy, extra tank, night flying instruments, with C. of A., etc., etc.—A. B. Golay, 7, Maychurch Close, Stanmore. [6625

MARSHALLS' FLYING SCHOOL, Ltd., for new and second-hand aircraft; part exchanges; sales and service repeat service.—The Airport, Cambridge. Tel. 56291. [0245

ROLLASON.—Aircraft for all purposes; to ensure early delivery order your machine now; prices and delivery dates on application for D.H. Dove, Miles Messenger and Aerovan, Auster 2- and 3-seaters.
C. of A.'s for ex-R.A.F. aircraft a speciality; repaints and colour schemes for flying clubs can be undertaken immediately.
ROLLASON for service and repairs; stockists of Rapide, Puss-Moth, Moth Minor, Gipsy Major and Cirrus spares; repair depot, Southampton Airport.
ROLLASON for everything aeronautical.
W. A. ROLLASON, Terminal House, Grosvenor Gdns., S.W.1. Sloane 0368-70. [6619

AIRCRAFT urgently required for training and charter work, with or without C. of A.; highest prices paid.—Brevet Flying Club, Ltd., 11, Chesterfield St., Mayfair, W.1. Grov. 1417 and 1353. [6454

CECIL KAY AIRCRAFT, Ltd., 10-20, Essex St., Birmingham, are Midland distributors for Auster and Percival aircraft; place your order now for early delivery; demonstrations can now be given. [0233

TWO Gipsy Major engines for sale, hours since new under 900 hours, since complete engine overhaul by makers 3 and 7 hours only, fully guaranteed; £210 each.—Brevet Flying Club, Ltd., 11, Chesterfield St., Mayfair, W.1. Grov. 1417 and 1353. [6455

KENNINGS, Ltd., Auster distributors, are in a position to give demonstrations to prospective purchasers.—Full details obtainable from the distributors, Kennings, Ltd., Queen St., Derby. Tel. 3636. 232, Cheetham Hill Rd., Manchester. Tel. Bla. 9111.

AIR CHARTER

MARSHALLS' FLYING SCHOOL, Ltd., Cambridge, for comfortable air travel; taxi and charter aircraft from 3-8 seats; write or telephone for further details.—Marshalls' Flying School, Ltd., The Airport, Cambridge. Tel. 56291 [0246

HOTELS AND ACCOMMODATION

ROYAL OAK HOTEL, Keswick-on-Derwentwater, heart of English Lake District; offers restful holiday to Air Force personnel; first-class accommodation at reasonable charges. [0814

HOLYWELL Bay Hotel, Cubert, Nr. Newquay, Cornwall. Tel. Crantock 242. 40 bedrooms, h. & c., licensed; overlooking the sea, excellent surf bathing, sandy beaches, etc.; book early for Easter and summer.—Proprietor, Sqdn. Ldr. A. L. Duke.

CARS FOR SALE

FOR sale, 1935 Buick coupe, repainted, new tyres, ready to drive away; £300.—Apply Southern Aircraft (Gatwick), Ltd., Gatwick Airport, Surrey. Tel. Crawley 811. [6618

CAR HIRE SERVICE

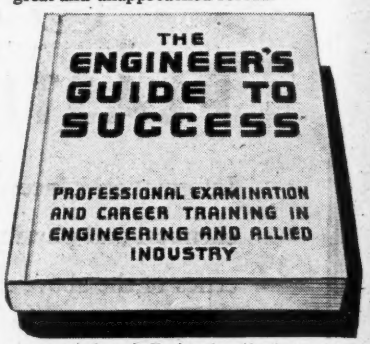
FORCES personal on leave from abroad requiring cars should apply to Wilson's (Brixton), Ltd., Trinity Gardens, London, S.W.9. Brixton 4011. [0228

CARS WANTED

CARS bought for cash, any condition.—Wilson's Coachworks, 16, Trinity Gdns., S.W.9. Brixton 4011.

FIRST PLACE COURSES

THIRTY-SEVEN FIRST PLACES have been gained by the home-study students of the T.I.G.B. in the A.F.R.Ae.S. Examinations of the Royal Aeronautical Society—a great and unapproached record.



Aeronautical and Engineering Students should particularly note that both Government and Industry have publicly stated that young men with technical knowledge and qualifications are to receive every chance of rising to the highest positions within their capacity in post-war industry. Write to-day for "The Engineer's Guide to Success"—free—and use the FIRST PLACE COURSES of the T.I.G.B. to obtain qualifications and success.

THE TECHNOLOGICAL INSTITUTE OF GREAT BRITAIN,
37, Temple Bar House, London, E.C.4.

FIELD AIRCRAFT SERVICE

Immediate Technical and Works Resources available for:

- **Service, Maintenance and overhaul of all types of aircraft.**
- **Complete overhaul of light and heavy types of engines.**
- **Conversion of aircraft to operator's requirements.**
- **Tool and Component manufacture.**

London Area and Midlands

FIELD CONSOLIDATED AIRCRAFT SERVICES LTD
Great Woodcote House, Woodcote Drive
Purley, Surrey.
Telephone: Wallington 7001.
Nottingham Aerodrome, Tollerton, Notts.
Telephone: Tollerton 8297.

C.R.C.11

RATCHET & REVOLUTION COUNTERS
Speeds up to 6,000 R.P.M.

Send for leaflet No. 18/4.
B. & F. CARTER & CO., LTD., BOLTON, 6.

LARGE SLIDE NUTS · DOG WASHERS
to the specific requirements of our customers.

Bar Repetition Products made specially to Air Ministry Requirements

Makers of all types of repetition products from the bar in all metals.

M-C-L and REPETITION LTD. Pool Lane, Langley, Birmingham.

SITUATIONS VACANT

EXPERIENCED signals instructor with knowledge of radar aids.—Apply, with full details of qualifications, to Air Service Training, Hamble, Southampton.

SOUTHERN AIRCRAFT (GATWICK), Ltd., Gatwick Airport, Surrey, have vacancies for ground engineers with C. of A. and repair work experience on civil aircraft.—Apply Labour Supervisor. [0248

CHARTER pilots required with current B licence.—Applicants to forward full particulars of flying experience, hours dual and solo, age, and any administrative or language qualifications, to Box 6133.

DRAUGHTSMEN, senior, required with jig and tool experience, knowledge of jigs and tools an advantage, West London area; salary £8/13/6 per week.—Apply, stating experience, to Box 6134, c/o *Flight*.

DRAUGHTSMEN, senior, required with press tool experience; knowledge of press tools an advantage; West London area; salary £8/13/6 per week.—Apply, stating experience, to Box 6135, c/o *Flight*.

APPLICATIONS are invited from Air Force personnel with good engineering degrees to train as aircraft stressmen.—Apply to Chief Draughtsman, Aircraft Division, English Electric Co., Ltd., Corporation St., Preston. [6535

LOFTING draughtsmen required with previous experience of full scale layout work.—Write, stating qualifications, experience and salary required, to the Aircraft Staff Officer, Bristol Aeroplane Co., Ltd., Filton, Bristol. [6561

DRAUGHTSMEN wanted for civil aircraft project, must be fully qualified, with two or three years' aircraft experience.—Apply in writing, giving full particulars of qualifications, experience, age, and salary required, to Box 5853, c/o *Flight*. [6552

MOTOR transport mechanics and drivers wanted for large motor transport haulage, repair and storage depot.—Marshalls Flying School, Ltd., The Airport, Cambridge. Cambridge 56291. Please mark envelopes "Mechanics and Drivers." [6497

PLANNING engineers required by Midland engineering company manufacturing light automobile and aircraft units; only applicants first class experience considered; good conditions, salary; give particulars experience, qualifications.—Box 6079. [6596

SENIOR and junior design draughtsmen required for work on new type of civil aircraft, aeronautical experience essential; good salaries and prospects.—Apply to Personnel Manager, Percival Aircraft, Ltd., The Airport, Luton, Beds. [0241

STRESSMEN wanted for civil aircraft project, must be up to University degree standard, and some stressing experience desirable.—Apply in writing, giving full particulars of qualifications, experience, age and salary required, to Box 5856, c/o *Flight*. [6553

SENIOR designer draughtsmen possessing technical qualifications and necessary general engineering experience required by important Midland engineering company manufacturing automobile units; write, giving particulars, age, experience, salary.—Box 6078. [6595

TECHNICAL artist required for aircraft handbook illustrations, good style, sound knowledge of perspective and previous experience in similar work essential.—Write, stating qualifications, salary required, to the Aircraft Staff Officer, Bristol Aeroplane Co., Ltd., Filton, Bristol. [6560

WANTED, pilot to start work immediately, B licence, instructor's licence, second class navigator's licence, twin experience, operational this war; starting basic salary £400 p.a., £50 p.a. second nav., £50 p.a. wireless licence, 5/- per hour flying pay.—Tel. Mayfair 4203. [6621

WANTED, fully experienced junior and senior aircraft draughtsmen and stressmen, good opportunities for men of ability and initiative.—Apply, giving particulars of experience and salary required, to Chief Draughtsman, The English Electric Co., Ltd., Corporation St., Preston. [6536

THE de Havilland Aircraft Co., Aircraft Division, Hatfield, have vacancies for a junior technical assistant (aerodynamics), with engineering degree, and for a weight control assistant.—Reply in writing to Personnel Manager, stating qualifications, age, approximate salary required. [6605

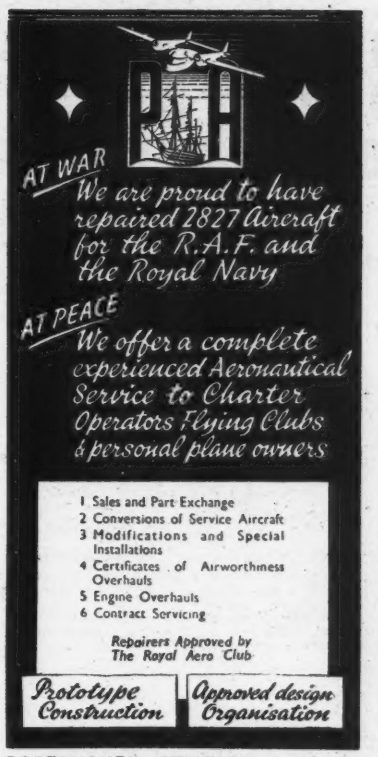
GLOSTER AIRCRAFT Co. require 1st class aircraft design draughtsmen and 1st class aircraft draughtsmen; permanent posts and ideal working conditions.—Applicants should make written application, giving fullest details of experience and qualifications, to Labour Manager, G.A.C., Hucclecote, Glos.

TECHNICAL representative with initiative and enterprise, capable of furthering sales development of installation for aircraft of primary importance to flying; excellent prospects for right man; age, qualifications, experience and salary required; flight engineer officer might suit if available immediately.—Write Box 6043, c/o *Flight*. [6590

LANCASHIRE AIRCRAFT CORPORATION, Ltd., have an immediate vacancy for a traffic manager, at a salary of £500 per annum; consideration will only be given to applicants who are fully acquainted with aircraft loading, civil procedure, freight and passenger handling.—Apply to Director of Aviation, Lancashire Aircraft Corporation, Ltd., Stanley Park, Blackpool. [6594

PRECISION engineering.—Applications are invited for the post of senior stressman. Qualifications required: B.Sc., engineering or maths., with practical experience in the stressing of aircraft undercarriages and hydraulics. Permanent post to suitable applicant.—Reply, stating age, qualifications, experience and salary, to Personnel Officer, Messier Aircraft Equipment, Ltd., Sankey, Warrington. [6593

NAVIGATION instructor required for progressive coaching school, ex-R.A.F. aircrew instructor with Martin or extra Martin certificate preferred but not essential; only those with highest qualifications need apply; salary £400 to £700 per annum according to ability. Also vacancy for chief instructor.—Reply, with brief summary of Service history, flying hours, nautical experience, copies of testimonials, and whether application is for post of chief or junior grade instructor.—Box 6189, c/o *Flight*. [6616


AT WAR
We are proud to have repaired 2827 Aircraft for the R.A.F. and the Royal Navy
AT PEACE
We offer a complete experienced Aeronautical Service to Charter Operators Flying Clubs & personal plane owners
1 Sales and Part Exchange
2 Conversions of Service Aircraft
3 Modifications and Special Installations
4 Certificates of Airworthiness Overhauls
5 Engine Overhauls
6 Contract Servicing
Repairers Approved by The Royal Aero Club
Prototype Construction
Approved design Organisation

PORTSMOUTH AVIATION LIMITED
THE AIRPORT, PORTSMOUTH Tel Portsmouth 74374

QUICKER-STRYP No. 32

REMOVES HIGH TEMPERATURE STOVED ENAMEL CELLULOSE WITH LEAD FILLER FRENCH POLISH VARNISH & THIN COATS OF PAINT IN ONE APPLICATION

IMPORTANT QUICKER STRYP Nom. 32 Approved for use by the Chief Inspector of Aircraft Production

This world-famous stripper is guaranteed acid and alkali free, non-inflammable, and non-injurious to eyes, skin or clothing.

It works rapidly and thoroughly, strips down to the bare wood, metal or glass *in one application* and, being non-volatile, does not dry up or leave a sediment. Usable to the last drop.

It has been used for many years, and with entire satisfaction, by the British Aircraft and Automobile Industries.

Owing to shortage of materials we are still producing and supplying QUICKER-STRYP WAR TIME SUBSTITUTE No. 32, which, like the original it temporarily replaces, is still the best on the market.

Due to control, supplies are available only for work of national importance.

QUICKSTRYP CHEMICAL CO. LTD.
104, Morley Street, Bradford.
We deal exclusively in Paint Removers. Ask for descriptive leaflet of our Products.
For Economy use QUICKER-STRYP

SITUATIONS VACANT *contd*

EXPERIENCED and capable stressmen wanted for responsible positions in technical office; must be able to think for themselves, instruct others and take full responsibility for their work; good salary and prospects for the right men.—Apply to Personnel Manager, Percival Aircraft, Ltd., The Airport, Luton, Beds. [0240

APPLICATIONS are invited for the following positions from suitably qualified men having specialised experience in one or other of the functions named: designers, draughtsmen and estimators for diesel engines (traction and marine)), chemical, boiler and general engineering departments; also planning and methods engineers, jig and tool designers and draughtsmen, motion study engineers, ratefixers and progress engineers; men on demobilisation leave who are in a position to seek employment on their own initiative are encouraged to respond.—Replies should state clearly to which position they refer and give full details of age, education, experience and salary required, to the Personnel Manager, Davey, Paxman & Co., Ltd., Standard Ironworks, Colchester. [6620

SITUATIONS WANTED

YOUNG woman, B.Sc. mathematics, seeks post.—Box 6136, c/o *Flight*. [6609

R.A.F. fitter IIA, experienced, air frame repair overhaul, chiefly Lancaster, 32 demob. group, capable taking examination, keen, conscientious.—Box 6142, c/o *Flight*. [6612

SQUADRON leader engineer officer, aged 32, Halton apprentice, fitter I, 15 years' R.A.F. experience, now released, seeks responsible post in civil aviation.—Box 6081, c/o *Flight*. [6598

EX-AIR Ministry radio and electrical technical instructor seeks similar or executive post, experienced with aircraft and ground station equipment.—Box 6137, c/o *Flight*. [6610

R.A.F., 5 years Officer Commanding M.T. repair units, due for release April, age 39, desires post as maintenance engineer or similar administrative capacity.—Box 6194, c/o *Flight*. [6623

FREE-LANCE pilot, 8,000 hours all types landplanes, "B" licence, experienced all overseas routes including Atlantic and Pacific, available for ferrying and private charter.—Box 6111, c/o *Flight*.

EX-R.A.F. engine fitter requires position with prospects, previous experience covers 3½ years on most types of British and American engines, exceptionally keen to carry on aero engine work.—Box 6188.

EX-F.A.A. lieut. pilot (25) requires either administrative or flying appointment, 6 years administrative, 4 years flying, 1,000 hours, 115 deck landings, 14 types, tireless worker, dependable; excellent references, keen to serve either home or abroad.—Box 6144, c/o *Flight*. [6614

EX-R.A.F. fitter II eng., Class A release, single, age 26, seeks position with prospects and scope for improving technical qualifications, civil or commercial aviation, enthusiastic, keen, reliable, five years' experience maintenance work, various engines.—Box 6113, c/o *Flight*. [6602

EX-R.A.F. pilot, 24, over 1,200 hrs. single Cat B inst., 450 hrs. twin, above average transport captain experienced with weather conditions in Canada, U.K., Burma, accident free record, wants position either as flying instructor or commercial pilot.—Box 6138, c/o *Flight*. [6611

VERSATILE pilot seeks situation, 1,000 hours, 45 types (single, twin, four engined), interested ferrying, demonstrating, commercial or club conversion, instruction, etc., or ground occupation utilising above experience, home or abroad, available immediately.—Box 6112, c/o *Flight*. [6601

CHIEF draughtsman desires change, similar position or as technical assistant to works manager; experience light engineering, electrical and mechanical instruments and equipment for mass production commercial and aircraft; good disciplinarian; London preferred.—Box 6193, c/o *Flight*. [6622

EX R.A.F. officer, "B" licence, 2nd class navigator's licence, 5,000 hours flying, including instructing, charter and testing, drawing office and workshop experience, several years factory administration, seeks an opening where his wide experience can be used.—Box 6015, c/o *Flight*. [6580

ONE moment please! Ex-R.A.F. Cpl. engine fitter, age 26, now on release leave, 6½ years' experience various types aero engines, installations, inspections and maintenance, interested technical drawing, desires progressive position with civil aviation or private owner; excellent Service refs.; any offers?—Box 6114, c/o *Flight*. [6603

GROUND engineer (30), C licence covering Pegasus, Merlin, Wasp engines, de Havilland propellers, 11 years' experience of maintenance and servicing aircraft, 4 years flight engineer flying boats, 4 years instructing in aeronautical engineering, ex-A.I.D. inspector, requires immediate post in civil aviation.—Box 6143, c/o *Flight*. [6613

YOUNG R.A.F. flight lieutenant engineer officer, age 25, A.F.R.Ae.S., higher national certificate (aeronautical engineering), 3 years aircraft apprenticeship, engines and airframes fitter, 3 years' practical aircraft work, 3½ years engineer officer, release in March; all types of offers seriously considered, willing to undertake conscientiously any further specialised training if required.—Box 6080, c/o *Flight*. [6597

REPAIRS, WELDING, ETC.

MARSHALLS' FLYING SCHOOL, Ltd., offer full facilities for servicing repairs and C. of A. overhauls for civil aircraft.—The Airport, Cambridge. Tel. 56391. [0247

TIME RECORDERS

TIME recorders.—Service rental. Tel. Vigilant 4731.—Time Recorder Supply and Maintenance Co., 28, Mayfield Rd., Sutton, Surrey. [0196

STAFF time checking and job costing time recorders (all makes) for quick cash sale; exceptional condition.—Box 7020, c/o *Flight*. [0040

W. B. Bawn

Sheet Metal Work • Steel Plate Work • Fabricated Welded Steel Work in any thickness • Profile Gas-Cutting • Hydraulic Press-work • Engine Test Beds • Machine-Shop Work • A.I.D. approved

ENGINEERS AND CONTRACTORS

Byron Works • Blackhorse Lane • London, E.17

Phone: LARkswood 4411-3 Grams: Bopeep, Walt, London

& COMPANY, LIMITED, FOR HEAVY METAL WORK

MISCELLANEOUS

AIRCRAFT souvenirs.—Solid brass scale castings, 56 British, U.S.A. types.

SUPPLIED unfinished for filing & polishing; transparent plastic display stands, propellers, transfers, etc.; also chrome finished models, mounted on stands, complete for presentations & gifts; send 2½d. stamp for list; goods sent to Services abroad.—Gibb, 153, Oxford St., Glasgow. [6547

MONOMARK; permanent London address; letters redirected; 5/- p.a.—Write BM/MONO88, W.C.1.

R.A.F. officers' uniforms purchased; new and re-conditioned kit for sale.—Fishers, 88, Wellington St., Woolwich. Tel. Woolwich 1055. [0196

STAR Recognition, by Francis Chichester, 8/- post free. An original and effective method of training in star recognition. The Star Recognition trainer (25×40in) shows nearly 400 stars in seven different shapes and sizes, according to their magnitude. A second star chart of the same size omits names and groupings in order to test or train the student. The trainer, the chart and a descriptive booklet are contained in a compact cloth case.—Publishers: Allen & Unwin, 40, Museum St., London, W.C.1. [6599

THE new Eccles "Enterprise" caravan, 14ft 9in long, treble panelled, one double and two single berths, two tables, two wardrobes, end kitchen, oil cooking; price £431 plus £122/17/4 (P.T. will be refunded if Government decides it is not due); hire purchase deposit £185 and 24 monthly payments of £17/10 approx.; gas cooking and lighting £25, anthracite stove £25; delivery from stock.—On view (and also centre kitchen model) at F.O.C. Caravan Centre, 206, Cricklewood Broadway, N.W.2. Gladstone 2234. [0207

OILSKINS free of coupons.—Surplus from public utility company, and reconditioned as new; suit consists of heavy black oilskin ¾ length coat, shoulders interlined, button to neck, with storm collar, also heavy black oilskin trousers, guaranteed absolutely waterproof; price 35/- per suit, postage 1/- extra; sou'wester to match, 3/- extra; all sizes orderable; state chest and waist measurement when ordering; limited supplies; cash back if dissatisfied; also A.R.P. yellow oilskin coats, full length, 15/6.—Willson Brothers (Dept 14), Epsom, Surrey. [0234

A CARAVAN?—An ex-editor caravan paper and member C.D.A.A., still living on site in a van (cheaply—less overheads!). I can offer best value in the trade—better than you'll often get privately. But no muck, no converted coaches, etc. Examples: 16ft 4-berth Cheltenham, as brand new, light oak interior, gas, water tank and pump, £450; 4-berth unused 16ft double van, Midland, £250; 10ft Eccles motor van, cost £1,000, accept £465. And 14 more from £125, including the new 1946 Eccles, £431, plus tax; easy terms.—A. S. Jenkinson, Pudds Cross, Bovingdon Herts Tel. Boy. 3261. Stn. Chesham. Bus to White Hart cross roads where see sign in distance. [6592

WANTED

WANTED to purchase, large quantities offents, various sizes, thicknesses, against licence.—Box 5626, c/o *Flight*. [6518

PACKING AND SHIPPING

R. & J. Park, Ltd., 143-9, Fenchurch St., E.C.2. Tel. Mansion House 3083. Official packers and shippers to the aircraft industry. [0012

SPEED OF THE WIND on

Scott MOTOR CYCLES!

SCOTT MOTOR CYCLE CO. SHIPLEY, YORKS.

WANTED

BACK VOLUMES OF

JANE'S "ALL THE WORLD'S AIRCRAFT"

For the following Years:

1913	1918	1935
1914	1930	1936
1915	1931	1937
1916	1932	1938
	1933	

Reply, Box No. 5888, c/o "Flight," Dorset House, Stamford Street, London, S.E.1.

Aero & Jig & Tool Draughtsmen in Great Demand

MEN AND YOUTHS

There is an insatiable demand for Aero, Jig and Tools, etc., Draughtsmen and Inspectors. So acute is the present shortage that employers are only too anxious to engage those with no previous practical experience who are able to prepare neat and accurate drawings.

QUALIFY AT HOME—IN SPARE TIME

After brief, intensely interesting study—undertaken at home in your spare time—*YOU* can secure an attractive and interesting post as **Aero-Draughtsman.** Numerous vacancies are also available in **Electrical, Mechanical, Plastics,** etc., branches of Draughtmanship.

FREE GUIDE

The Free Guide contains 132 pages of information of the greatest importance to those seeking such success compelling qualifications as **A.M.I.Mech.E., A.F.R.Ae.S., A.M.I.P.E., A.M.I.E.E., Matric. and B.Sc.,** etc., also **R.A.F. Entry** (Maths., etc.), together with particulars of our remarkable Guarantee of

SUCCESS—OR NO FEE

Write now for your copy of this remarkable publication. It may well prove to be the turning point in your career.

NATIONAL INSTITUTE OF ENGINEERING

(Dept. 427), 148-150, HOLBORN, E.C.1

(South Africa Branch E.C.S.A., P.O. Box 8417, Johannesburg.)

Good Progress in the AIRCRAFT INDUSTRY

is open to those who avail themselves of the services of the I.C.S., the world's largest and greatest school teaching by post.

Men who are eligible for the **Air Ministry's Examinations in Categories A, B, C and D** will find the I.C.S. Ground Engineer's Course a sound preparation for success.

We also offer fully adequate instruction to those who wish to enter the **Drawing Office** or to specialise in **Aero Fitting and Rigging** or **Aero-Engine Fitting.** And we have special Preparatory Courses for **R.A.F. Entrants.**

Special terms for members of H.M. Forces

Write to the I.C.S. Advisory Department for booklet of particulars of our Courses in Aeronautical Engineering.

INTERNATIONAL CORRESPONDENCE SCHOOLS, LTD. ICS

Dept. 182, International Buildings, KINGSWAY, LONDON, W.C.2

COTTON BAGS

IN ANY COLOUR OR SIZE WITH OR WITHOUT LABELS

FUTURIST SOFT FURNISHING COMPANY

Rookwood Works, Sandown Park, Liverpool, 15

A.I.D Approved No. 3599/42

TUITION

COLLEGE OF AERONAUTICAL ENGINEERING (of Chelsea), College House, Princes Way, Wimbledon Park, S.W.19 (Put. 4197).—Practical training for civil aviation. Syllabus from Bursar.

AIR Transport College, Ltd., now offer specialised training for Pilot's "B" and Navigator's licences. —Write for Pilot's "B" Booklet, to Air Transport College, Ltd., Dept. P.B.F., 2, Drapers Gardens, London, E.C.2. [0227

WIRELESS telegraphy.—Postal courses of instruction for P.M.G. certificates for Merchant Navy and Air Ministry for Civil Aircraft.—Apply British School of Telegraphy, Ltd., 179, Clapham Rd., London, S.W.9. (Brixton 3847.) Estab. 36 years. [0216

FLYING tuition on Tiger Moth aircraft available now; aerodrome only 2 miles from the town, with full restaurant and club facilities; qualify for your Pilot's A, B and/or Instructor's Licence at Marshalls' Flying School, Ltd., The Airport, Cambridge. Tel. 56291. [0244

AIRCRAFT TRANSPORT

LEP TRANSPORT, Ltd., leading transport, packing, shipping and salvage contractors to Air Ministry, M.A.P., and Aircraft Manufacturers and Operators. Air freight specialists.—Sunlight Wharf, Upper Thames St., E.C.4. Central 5050 (18 lines).

BOOKS, ETC.

STAR Recognition. Comprises trainer, 25in.×40in., also large star chart with 390 named stars. Booklet. Cloth case. From any bookseller, or 8/- posted. —Francis Chichester, 9, St. James's Place, London, S.W.1. [0231

AERONAUTICAL ENGINEERS AND AGENTS

R. K. DUNDAS, Ltd.—Aeroplanes, engines, aeronautical equipment and accessories; agents, at home and abroad, for the Aircraft and Allied Industries; branches and agents throughout the world.—Head Office: Airport, Portsmouth 74874. [0214

PRIVATE owners purchasing ex-Service aircraft Please note Southern Aircraft (Gatwick), Ltd., Gatwick Airport, Surrey, have facilities for overhaul and repairs for Certificate of Airworthiness, having serviced 90% of these types for the R.A.F. during the war, including all British, American and European machines [6488

CONSULTANTS

CONSULTANT scientist specialises in unusual problems.—Enq. invited, trade or private.—Box 5752.

S. J. NOEL-BROWN & Co., the Industrial Management Consultants, and their Associates are now in a position to consider forward contracts and assignments, home or overseas, in regard to production and material control and time and motion study; general investigation and contractual services are available at short notice.—Gt. Peter House, 2, Lord North St., Westminster, S.W.1. Tel. Abbey 2126 (5 lines). Grams, Gayfere Sowest, London. [0210

INSURANCE

BOWMAN & SONS, Ltd., Incorporated Insurance Brokers, for many years specialists to personnel of the flying services and civil aviation; departments life and house purchase, fire and motor, aircraft and flying risks.—78, Buckingham Gate, S.W.1. Tel. Whitehall 2491. [6574

PATENTS

THE proprietor of British Patent No. 514995, entitled "Improvements in or relating to navigational control apparatus," offers same for license or otherwise to ensure its practical working in Great Britain.—Inquiries to Singer, Ehlert, Stern & Carlberg, Chrysler Bldg., New York City, 17, N.Y., U.S.A.

PERSONAL

TOM LONG tobacco—put to test, Public opinion does the rest. [0026

LEADERS in the aircraft industry read "The Recorder." [0222

COLLEGE of AERONAUTICAL ENGINEERING

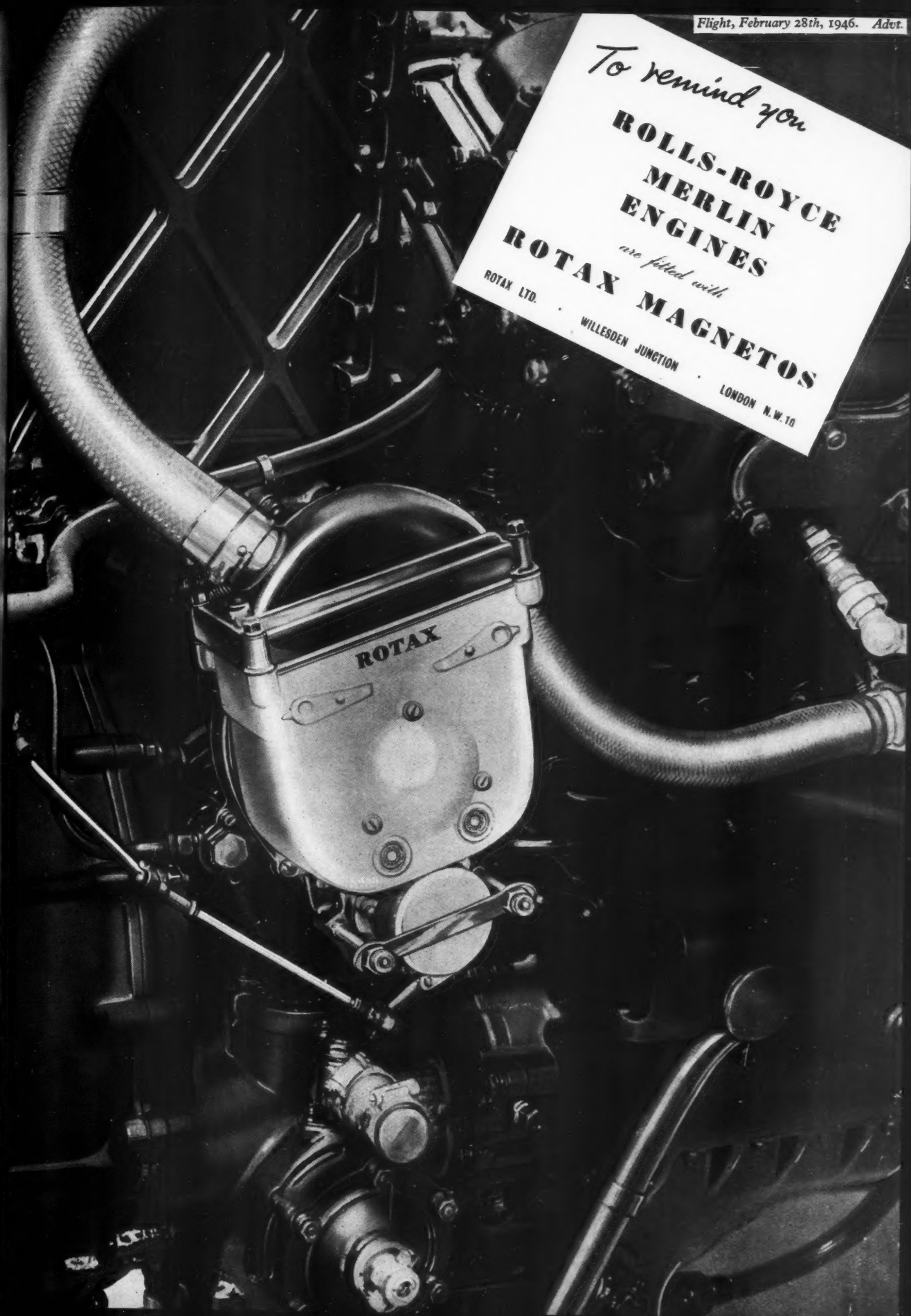
(of Chelsea)

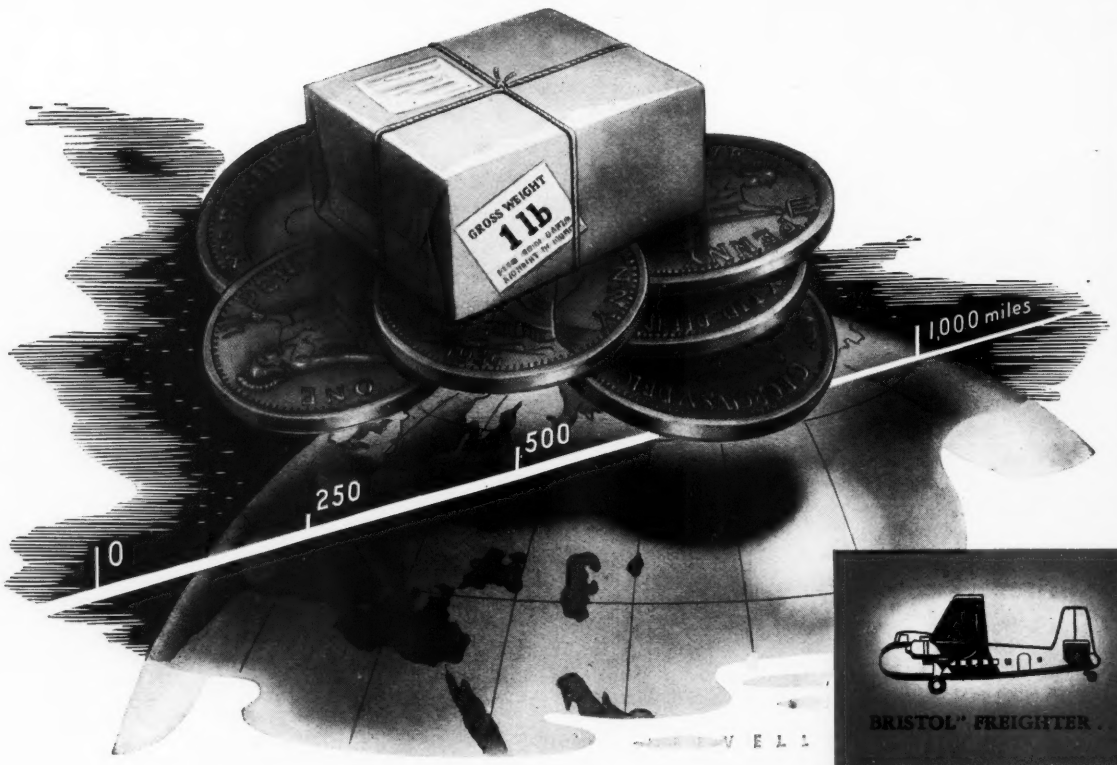
Wartime address:

COLLEGE HOUSE, PRINCES WAY WIMBLEDON PARK, S.W.19

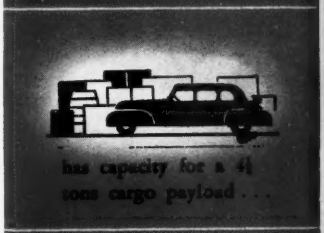
Tel.: Putney 4197.

Complete works and technical training for Civil Aviation. Entry from 16 years of age. Syllabus from the Bursar.


To remind you
ROLLS-ROYCE
MERLIN
ENGINES
are fitted with
ROTAX MAGNETOS
ROTAX LTD. · WILLESDEN JUNCTION · LONDON N.W.10
ROTAX



BRISTOL" FREIGHTER . . .



has capacity for a 4½ tons cargo payload . . .

or for differing ratios of passenger/cargo payload . . .

by facilities enabling rapid rearrangement of seating

Sixpence per pound per thousand miles . . .

A poundweight of freight carried by cargo aircraft from London to either Stockholm or Naples, Gibraltar or Budapest for little more than sixpence! . . . such a low freight rate is more than probable in the very near future, for the " Bristol " Freighter aircraft has been evolved purposely to provide an air freight service for industry at rates adding very little to the selling prices of goods exported by this speedy method. The " Bristol " Freighter, with its passenger counterpart, The " Wayfarer," sets new standards in cargo and passenger air transportation and opens up new spheres of activity for both industry and the individual.

THE BRISTOL AEROPLANE COMPANY LIMITED.

"Bristol"

. . . . *creating new standards in air travel*

Printed in England for the Proprietors, FLIGHT PUBLISHING COMPANY LIMITED, Dorset House, Stamford Street, London, S.E.1, by THE CORNWALL PRESS LTD., 1-6, Paris Garden, London, S.E.1.
" Flight " can be obtained abroad from the following: AUSTRALIA and NEW ZEALAND: Gordon & Gotch, Ltd. INDIA: A. H. Wheeler & Co. CANADA: Imperial News Co., Gordon & Gotch, Ltd. SOUTH AFRICA: Central News Agency, Ltd., Wm. Dawson & Sons (S.A.), Ltd. UNITED STATES: The International News Co. Entered as Second Class at the New York, U.S.A., Post Office.